

Building a Market-based System of Farm Composting of Commercial Food Waste

**Project Design,
Implementation,
and Lessons Learned**



**Center for
Ecological
Technology**





About the Center for Ecological Technology

A non-profit (501c3) organization established in 1976, CET works as a catalyst for changing practices that adversely impact the natural ecology of the Earth. Working with local industry, government and residents, CET demonstrates and promotes practical applications of sustainable technologies, providing affordable solutions that serve the entire community. Over the past 24 years, CET has directly served thousands of residents throughout Western Massachusetts and New England and has worked closely with local and state governments, non-profit organizations, businesses and farms.

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- Massachusetts Department of Environmental Protection - Recycling Industry Reimbursement Credit Program (RIRC) to increase recycling of food waste.
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- The Sudbury Foundation
- Previous support from the Massachusetts Department of Food and Agriculture and Rural Development USDA laid the groundwork for this project

Project cooperators include:

- City Soil and Greenhouse Company
- Conservation Districts of Berkshire, Franklin, Hampden and Hampshire Counties
- Massachusetts Department of Environmental Protection
- Massachusetts Department of Food and Agriculture
- Massachusetts Farm Bureau Federation
- New England Small Farms Institute
- University of Massachusetts Extension
- US Natural Resource Conservation Service

Executive Summary

The Center for Ecological Technology (CET) conducted the On-Farm Composting Project in Western Massachusetts from Fall 1996 through Spring 2000. The project successfully created a market-based infrastructure for farm composting of commercial food and other organic waste. To date, over 70 business locations diverted approximately 22,000 tons of organic materials to 7 farms using 6 haulers, and activity will continue as a regular “way of doing business” in the area. This waste diversion reduced greenhouse gas emissions by approximately 5700 Metric Tons Carbon Equivalent (MTCE). CET has shared project information with hundreds of colleagues from across the country.

Several factors played a role in the development and implementation of the project as well as its success including:

- progressive State policies relating to farm composting of off-farm wastes and the management of overall disposal capacity
- the area’s semi-rural demographics
- previous composting activity and interest in the area

CET identified several main obstacles to the creation of a longterm, stable market for food and yard waste composting on farms:

- the risks to potential participants, associated with the lack of an established infrastructure
- a lack of a critical mass of participants to make the logistics and economics work
- the need for quality control in separation and processing

CET’s general approach for the project was market-based, with a focus on making the economics work for all parties involved without ongoing subsidies. Through a decentralized approach, CET worked with many farmers, waste generators and haulers simultaneously to minimize the risk of the system failing due to any one participant’s situation. This approach also helped to minimize transportation distances and costs. Assistance was targeted to participants’ needs and provided with significant follow-up until the program became self-sustaining.

CET served as a liaison among interested businesses/institutions, haulers and farms willing to accept their organic waste. Assistance included locating appropriate participants, soliciting their participation and designing or improving organic waste separation, collection, storage, transportation and processing systems.

Case Studies outline key aspects of the operations of representative farms, waste generators (supermarkets, institutions, restaurants) and haulers. Sample project documents and tools and other pertinent reference materials are included in the report appendices.

Through the course of the project, CET learned important lessons that could be helpful to others in designing and implementing similar efforts:

- Composting programs can work economically for farms and larger waste generators
- Composting of commercial waste requires a high degree of maintenance but can be done successfully by some farms
- Many other farms can compost farm residuals or easier to manage materials
- For waste generators, separation and collection can be successful if the economics work and there is a strong commitment from management

Project Summary

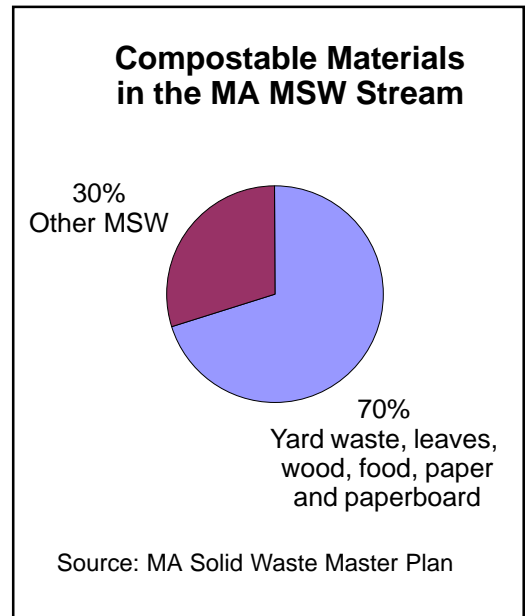
Project Purpose

The project was designed to develop and implement a comprehensive system of on-farm composting of commercial organic waste as a longterm “way of doing business” in the area. The system was designed to benefit the local environment, economy and community, and to provide a useful model for other regions to use in similar efforts across the country.

Benefits to Society

Composting of off-farm organic wastes on farms benefits society because it is a decentralized and low-impact method of organic waste management. According to the Massachusetts Solid Waste Master Plan, “Yard waste, leaves, wood, food, paper and paperboard account for as much as 70 percent of total MSW by weight. This percentage is even higher for agricultural and horticultural operations, and for many commercial and institutional establishments.” Diverting waste from landfills and incinerators saves valuable disposal capacity and minimizes disposal costs. Waste diversion also reduces pollution including greenhouse gas emissions.

On-farm composting of materials from on farm (e.g. manures, silage) can decrease odors, run-off and other neighbor and environmental concerns and is an integral part of sustainable agriculture. Use of finished compost on farms also reduces reliance on petroleum-based fertilizers and pesticides and their well-known detrimental environmental and health effects.



Benefits to Participants

Although the overall purpose of the project was to provide the benefits described above, the focus during project implementation was on providing benefits to participants in order to encourage their ongoing participation (see box below).

Benefits to Participants

Waste Generators

- Reduce waste management costs
- Create “green” marketing opportunities and public and regulatory relations benefits
- Build employee job satisfaction

Farmers

- Provide an income opportunity
- Create a valuable soil amendment for use on the farm or for sale to the public
- Enhance farm environmental stewardship

Haulers

- Provide an opportunity to diversify services, build loyalty among existing customers and attract new ones
- Provide lower cost disposal options
- Create marketing/public and regulatory relations benefits

Project Background

Several factors played a role in the development and implementation of the project as well as its success:

Demographics

Western Massachusetts contains a mid-sized urban center (over 350,000 residents in several contiguous cities in the Springfield area) surrounded by more sparsely populated rural areas with intermittent centers of commerce of 25-50,000 residents (Northampton/Amherst, Greenfield, Pittsfield, North Adams). Its four counties (Berkshire, Franklin, Hampden, Hampshire) are contained in approximately 2500 square miles and have a total population of approximately 800,000 residents.

Farming Climate

Federal, State and local agencies are becoming increasingly aware of farm pollution problems and are requiring farms to undertake stricter management of nutrients. Also, as the population increases and more citizens move closer to working farms, New England farms are facing increased pressure from neighbors concerned with odors and pollution from manures. Finally, New England farms, especially dairy operations, have been closing at a rapid rate over the past several years due to a variety of economic pressures and many farmers are seeking to diversify their operations.

Progressive Policy Relating to Farm Composting of Off-farm Wastes

The Commonwealth of Massachusetts has created a special exemption from the "Site

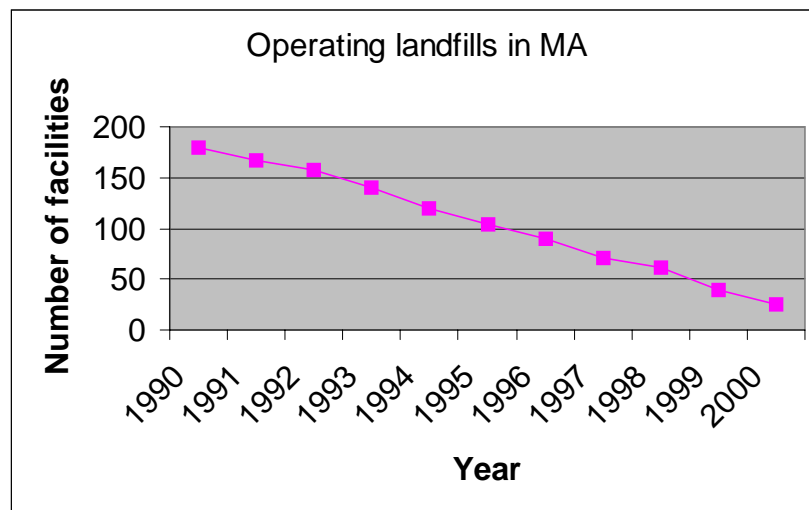
Assignment Regulations for Solid Waste Facilities" for farm composters who follow certain guidelines and register with MA Department of Food and Agriculture (DFA) (see Appendix L). This policy removes a significant regulatory and cost barrier while preserving important environmental and health standards. This unique opportunity for farm composting to expand has in turn helped to spur interest and activity in commercial composting ventures.

Progressive Policy Relating to Disposal Capacity

Over the past decade, DEP has ordered the closure of most of the small, unlined landfills in the State (see graph below). This action has had the effect of limiting MA disposal capacity, causing waste tip fees in MA to rise significantly. High waste tip fees and/or transport fees to more distant disposal facilities improve the economics for alternate collection of source separated material, especially for larger waste generators.

Previous Activity and Interest

Over the few years before the project began, several local farms performed a significant amount of work in establishing composting operations and attempting to form links to haulers and waste generators, including a supermarket chain and several restaurants. Also, through three small projects funded by the Massachusetts Department of Food and Agriculture (DFA) and the U.S. Rural Development Administration (RDA), CET identified existing and potential composters and organic waste generators in the area and facilitated several pilot links.



Barriers in the Marketplace

Through our initial work and a thorough review of related efforts across the country, CET identified several main obstacles to the creation of a longterm, stable market for food and yard waste composting on farms:

- **Lack of established infrastructure.** Farmers, haulers and waste generators were reluctant to invest time and money into setting up operations to serve a small, fledgling market with its associated risks. Those ready to begin operations needed information and technical assistance to succeed.
- **Lack of critical mass of participants.** The market needed a “jump-start” to attract enough farms and waste generators to allow for cost-effective collection and hauling with full trucks driving shorter distances.
- **Need for quality control.** Loads needed to be free of contamination, composted properly and tested to ensure a quality end product. Compost produced for farm use or for sale must meet needs for quality, consistency and price. The impact of compost sites must meet regulatory and community standards.

General Approach

- **Market-based** - economics must work for all parties involved without on-going subsidies.
- **Decentralized** - work with many farmers, waste generators and haulers at the same time while not interfering with competitive market forces (e.g. pricing or directing materials to specific locations).
- **Targeted** - provide on-site outreach and services that meet the specific needs and motivations of each project participant.
- **“Temporary” long-term** - provide participants with significant follow-up assistance while facilitating the eventual institutionalization of the program.

Methodology

Project Budget and Timeline

The project took place from Fall 1996 through Spring 2000. The total project budget was approximately \$270,000. The vast majority of program costs were related to staffing, which varied over the 3.5 years of the project. Staffing was at its highest during the second year of the project, with a .4 FTE manager, total of 1.2 FTEs staff and a technical consultant. Approximately \$12,000 of the budget was spent on equipment or site work at compost sites. A complete project actual budget and information on staffing levels is included in Appendix N.

The project objectives and general approach (see boxes) were designed to overcome the barriers described above. The project had several overlapping phases which are described below: initial outreach, infrastructure building and closeout. Details on the actual operations of participants are described in Case Studies later in the report.

Initial Project Outreach

CET developed a set of services to offer to each marketplace sector (see box) and began approximately 6 months of intensive outreach and marketing activities to solicit participation. Initial direct outreach targeted area farms known to be composting, as well as all area farms through a mailing. CET obtained approval from the Massachusetts Farm Bureau Federation to send a

Project Objectives

CET had three primary objectives for the project:

- Provide direct outreach, education and technical assistance to farmers, waste haulers and organic waste generators to encourage participation
- Develop the connections and ultimately self-supporting infrastructure needed for participants to succeed
- Spread project information nationwide, sharing lessons learned and results with other composters, haulers and waste generators and agencies that serve them

letter introducing the program and describing available services to 375 member farmers in Franklin, Hampshire and Hampden Counties (see Appendix A). In addition, a brief notice of the letter was included in the Farm Bureau newsletter to encourage farmers to read and consider the letter. Approximately 15 farmers initially responded by requesting site visits and assistance in starting composting.

During the site visit, CET evaluated the needs and interest level of the farmer and discussed the assistance that CET could offer. CET also provided an information package on composting and source separation as well as a list of publications and free loaner video tapes that address many aspects of composting.

CET contacted each hauler in the area at the beginning of the project to explain the project, encourage their participation and offer assistance. Phone calls to each hauler were followed by meetings when interest was expressed. Each hauler, regardless of its response to initial phone and site visit outreach, received a letter describing the project and services available (see Appendix A).

CET targeted several waste generators in the area, based on size and waste type, for initial outreach through the project. CET targeted generators that were likely to produce enough organic waste to warrant separate collection in a compactor, or who had multiple locations that could serve as the anchors for a dumpster route. CET solicited participation through telephone calls and follow-up site visits. CET also approached particular waste generators at the request of waste haulers or farmers that served the generator.

Materials Diverted

food waste	paper
produce	grass clippings
kitchen preparation	leaves
plate scrapings	brush
bakery	wood chips
deli	manure and bedding
food processing waste	dairy
brewery mash	poultry
pickles	horse
wheat starch	wood pallets
ice cream	lake weeds
waxed corrugated cardboard	

Infrastructure Building

After the initial outreach period, project activities involved an ongoing mix of tasks including:

- start-up technical assistance
- follow-up troubleshooting
- media promotion of results to date to encourage additional participation
- targeted direct outreach to develop additional diversion, processing and/or hauling capacity, depending on the need
- outreach and assistance to colleagues
- measurement and reporting to funders

This phase of the project constituted the majority of the time and resources spent. As the system was being developed, it was continually changing and required constant attention. Each of the three sectors had to be built up as needed to accommodate the needs of the other sectors. Participants on the learning curve required troubleshooting assistance. These activities continued right up to the end as new waste generators were being added in the final weeks of the project.

The major activities performed for each sector as well as general outreach and promotion are described below.

Farmers

Assistance to farmers included identifying appropriate organic waste generators and arranging transportation details including appropriate fees, hauler, delivery times, waste container ownership and maintenance and other details. A template contract was developed and used by several farmers (see Appendix F). CET also assisted in tracking tonnages and payments between multiple generators, haulers and composting sites.

CET offered extensive assistance in organic waste quality control and management and regulatory issues. CET worked closely with local Boards of Health, MA DFA and MA DEP to ensure that participating farmers had the necessary technical information and assistance to compost successfully and to operate within all applicable guidelines and regulations. CET notified local Boards of Health of composting activities and communicated with them during official meetings and site visits in order to provide information to the

Boards and receive feedback on the performance of the compost operations.

Repeated, periodic follow-up consultation was needed to ensure successful composting operations. After receiving feedback from DFA and DEP regarding a growing concern about the conditions of some of the compost sites, CET added two highly experienced technical consultants to the project and dedicated a significant amount of time and resources to improving operations at several of the most active sites.

CET worked extensively with a variety of stakeholders to address several critical issues regarding farm composting of food and waxed corrugated cardboard waste that developed as a result of the increased activity brought about through this project. These included mediocre or inconsistent performance of compost operators, lack of clear and consistent enforcement of guidelines for site appearance and operational procedures, and differing interpretations of the intent and application of the agricultural exemption for composting.

Working with CET, DEP developed interim standards regarding the operations and appearance

of agriculturally exempt compost sites accepting commercial waste and applied them to one farm. CET and DEP worked extensively with the farm to successfully bring that operation into compliance by developing a timeline of needed actions (see Appendix G) and providing repeated on-site consultations regarding implementation. CET also developed a guidance document and operational checklist for DEP that specifically address composting of food and waxed corrugated cardboard at agricultural operations (available on request, see Appendix P).

CET provided farmers with information on compost testing services and offered free testing through the UMass soil science lab (see Appendix E). CET sent a survey to area composters regarding equipment use and needs in order to improve the availability and costs of needed composting equipment. Survey results were compiled, and follow-up technical assistance and informational mailings were conducted (see Appendix H). CET also coordinated cooperative rentals of screening equipment with several participating compost sites, which provided cost savings to those sites.

Services Provided

Farmers

- Outreach and education to promote the concept and encourage participation.
- Assistance registering with the Department of Food and Agriculture and with other regulatory issues.
- Technical assistance with composting methods, equipment, testing, marketing and/or use of end-product.
- Promotion of participation and results to stakeholders.

Waste Generators

- Outreach and education to promote the concept and encourage participation.
- Walk-through assessments of current waste management systems.
- Design and implementation of separation systems including employee training and procedures.
- Tracking and documentation of savings.
- Promotion of participation and results to stakeholders.

Haulers

- Outreach and education to promote the concept and encourage participation.
- Encourage participation of a “critical mass” of waste generators and composting locations so haulers have enough customers and disposal options to justify making changes to their business.
- Promotion of participation and results to stakeholders.

CET provided three of the most active sites with a small amount of DEP funds to improve their operations. Assistance included test rental of screening equipment and installation of a compost pad. Details of this activity are described in Composting Food and Waxed Corrugated Cardboard at Agricultural Operations (see Appendix P).

The majority of farms served ended up composting farm materials and/or leaf and yard wastes only. These farms benefitted from project assistance to begin or enhance their operations. Examples of farms assisted include dairy and turkey farms composting manure and bedding materials, farms that began composting municipally collected leaves, and stables that diverted manure and bedding to other composting farms.

UMass Extension

CET worked with the UMass Extension through a variety of initiatives designed to help farmers.

- Free compost tests from the UMass Soil Testing Laboratory were provided to area composters to familiarize them with interpreting test results and evaluating their product.
- CET worked with the Landscape and Nursery Educator to produce Guidelines for Using Compost in the Green Industries to educate Landscapers, Nurserymen and Turf Growers on the purchase and use of compost (see Appendix P).
- A “Twilight Meeting” for farmers demonstrated farm composting to over 50 growers and farm service agency personnel.

Waste Generators

CET served as a liaison between interested businesses/institutions, haulers and farms willing to accept their organic waste. Assistance to waste generators included locating an appropriate destination farm and arranging transportation details. Businesses were encouraged to contact their current hauler first when seeking organics collection service. If the hauler did not provide the service, CET assisted in finding and selecting another hauler for that service.

CET also helped businesses with the design and development of organic waste separation, collection and storage systems. Factors including space constraints, cost, security and employee safety were considered in the design process. CET also assisted with employee training and implementation, including start-up meetings, written procedures and signage (see Appendix J). CET inspected trial and actual loads and provided feedback to the waste generator on any problems with the cleanliness of its materials (e.g. plastic packaging from inadequate separation or trash from improper disposal). Finally, CET tracked diversion and resulting savings and provided individualized summaries periodically to interested generators (see Appendix I).

Haulers

CET assisted haulers in achieving efficiencies by developing and promoting a group of composting sites located in areas of concentrated organic waste generation. CET helped haulers set up and/or fill-in collection routes to service organic waste generators. CET facilitated subcontracting organics collection services for several nearby organics stops serviced by several haulers to one hauler so that stops could be combined to more efficiently fill a truck. Customers with questions about the organics program could call CET first and CET would contact the hauler if needed.

General Outreach and Promotion

CET worked with all participants to provide opportunities for promoting their activities, which served the dual purpose of giving recognition and creating goodwill for existing participants and promoting the practice to potential participants. General ongoing outreach included articles in the local media, presentations and announcements at group meetings and feature articles in trade newsletters and other publications (see Appendix M). Also, individual businesses included program information in their own circulars, annual reports, advertising, and promotional videos. CET also assisted participants in identifying and applying for a variety of awards to recognize their work.

CET hosted events at participating businesses and farms attended by hundreds of municipal, agricultural, commercial, industrial, and governmental representatives. The events also captured media attention, receiving local TV, radio, and newspaper coverage. CET conducted many tours of farm and generator sites for regulators and other interested parties.

CET also conducted a significant amount of ongoing outreach to state, federal and local regulatory personnel, legislators and others to build support for the project and organic waste recycling in general. This outreach included distribution of project articles and reports, invitations to tours and promotional events and one-on-one discussions.

Closeout

As the end of the project drew near, CET began reminding participants that its role would end shortly (all participants had understood this would happen from the beginning). Most participants were already operating without regular CET assistance. CET worked with those participants that still

required assistance to identify final activities needed before the project's end. Several waste generators wanted to add additional locations and this was accomplished. The farm sites were targeted for the majority of close-out work in order to ensure the ongoing success of their operations.

In order to ensure a smooth transition as CET's project ended, in the last month CET sent letters to each project participant, notifying them of the end of the project and providing individualized summary composting program and contact information (see Appendix K). A recognition certificate was included. Feedback from the mailing was positive, with participants indicating that they are ready to continue without CET assistance.

Project Participants

Waste Generators

Amherst School System
Atkin's Fruit Bowl
Bertucci's
Big E Super Markets
Big Y Foods, Inc.
Bread & Circus Whole Foods Market
C&S Wholesale Grocers, Inc.
Cain's
City of Chicopee
City of Pittsfield
Cooley Dickenson Hospital
Cooper's Market
Deerfield Academy
Drumlin Farm
Dunkin' Donuts
Elms College/Aramark
Foster's Supermarket
Friendly's Ice Cream
General Dynamics Defense Systems
Greenfield's Market
Hangar Restaurant
Hot Mama's
Husky Injection Molding
Joiner's Farm
Kripalu Yoga Center
La Cazuela

Mohawk School District
Montgomery Rose
Mt Holyoke College
Northampton Brewery
Northampton DPW
Otis Poultry Farm
Pioneer Valley Grower's Cooperative
Price Chopper
Shar-Lu Farm
State Street Market
Stop & Shop Supermarkets
Swift River School
UMASS IPF
Undermountain Farm
UpCountry Seitan
Vipassna Meditation Center
Waldbaum's Foodmart
Williams College

Farms

Atkins Farm
Bear Path Farm
Becket-Chimney Corner Camps, YMCA
Berkshire Compost
Blue Rider Stable
Brookfield Farm
Caisse Farm
Chase Hill Farm

Clover Hill Farm
Coppinger Farm
Dearview Farm
DelfTree Corporation
Diemand Egg Farm
Earthcare Gardens
Everett Farm
Four Rex Farm
Full Cycle Composting, Inc.
Full Bloom
Graves Farm
Harvest Farm of Whately
Holiday Farm
Indian Line Farm
Laurel Hill Farm
Leonard Farm
Mahaiwie Harvest at Sunways Farm
Manheim Farm
Martins Farm
McCray's Farm
McKusick Farm
Micka Farm
Mt. Williams Greenhouses
Mt. Toby Riding and Boarding
North Adams Compost Site
Orange Compost Site
Otis Poultry Farm

Saradoff Farm
Scantic Valley Farm
Shar-Lu Farm
Sheffield Foods, dba Berkshire Compost
Shiel Farms
Smith Vocational School Farm
South Hadley Compost Site
Southwick Compost Site
Spellman Farm
Suitable Edibles
Sunnybanks Ranch
Taft Farms
The Homestead Poultry Farm
Tweenbrook Farm
UMASS IPF
Walnut Hill Farm
Warner Farm
Westview Farms

Haulers

Alternative Recycling Systems
Browning Ferris Industries
Duseau Trucking
Martin's Farm
Master Garbologist
Waste Management

Results

CET successfully completed project work and met or exceeded project goals. Currently, 45 waste generators at 74 locations, 7 farmers and 6 haulers are participating. Organic waste is being collected from 33 supermarket locations (Stop & Shop, Big Y, Foodmart, Bread and Circus, and several individual stores), 4 restaurants, 17 institutions/schools, 5 food processors, 1 greenhouse, and 1 wholesale grocer, and 13 other organics generators. Supermarkets are achieving diversion rates of up to 68% through their recycling and composting efforts.

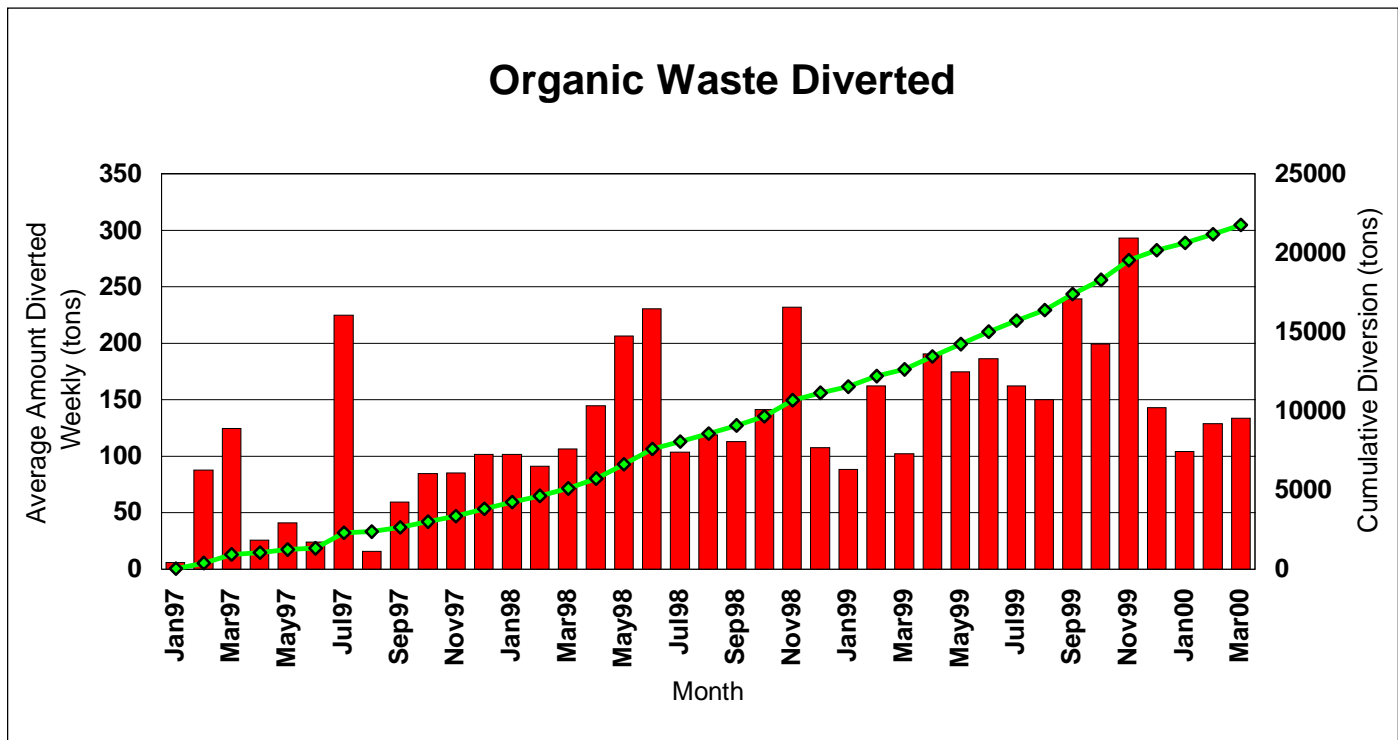
CET has successfully exceeded its final goal to divert an average of 170 TPW, and anticipates that the current level of activity will continue as an ongoing way of doing business in the area. A total of 21,758 tons of food waste, waxed corrugated cardboard, yard/leaf waste, manure/bedding, and clean wood waste have been diverted to new or expanded composting operations since January 1997. The average for the last program year (April 1999 - March 2000) was 175.6 tons per week (TPW). Total waste diversion to date has reduced greenhouse gas emissions by an estimated 5711 Metric Tons Carbon Equivalent (MTCE) (see Appendix O). This reduction is equivalent to that

gained from over 20,000 trees over a 40-year lifetime.

Dozens of farms received assistance in composting manures and other farm wastes as well as easier to manage off-farm materials including leaf and yard waste.

Also, several industry led efforts are beginning in the area which may expand the amount of diversion taking place in the near future. A local hauler, the City of Northampton and a farm are designing a program to compost food waste from City schools and restaurants. A supermarket chain has begun a composting program in another market region and with MA DEP plans an expansion of the program to cover another market region soon. CET is currently conducting a Greater Boston Food Waste Recycling Project with EPA and DEP funding. The project is designed to build the infrastructure and increase activity in Eastern Massachusetts.

CET shared project information with hundreds of colleagues from across the country and internationally. Project information was used in designing related efforts in many areas including Boulder, Colorado; Portland, Oregon; Sonoma County, California; Wisconsin; North Carolina, and Indiana.



Conference Presentations

- Northeast Resource Recovery Association (NRRRA) Conference 97,98,99,00
- Northeast Region BioCycle Conference 97,98
- National BioCycle Conference 98
- New England Environmental Expo 98
- National Recycling Coalition Conference 96,98,99
- MA DEP Pay-as-you-throw Workshop 98
- Northeast Recycling Council Quarterly Meeting 99
- EPA JTR Roundtable Conference 00

Media Coverage

- BioCycle Magazine
- Resource Recycling Magazine
- Wastecap of Massachusetts Newsletter
- MassRecycler
- Business West Magazine
- Local media

Awards

- MassRecycle Commercial Recycling Award 1999 (CET)
- EPA Partners for Change Award (multiple participants)
- City of Northampton Certificate of Recognition (multiple participants)

Project Evaluation Criteria/Results

	Goal	Final Results
Number of farmers reached	75-100 direct contact site visits, meetings	> 100 directly contacted
	400-500 indirect (mailings, newsletters)	> 500 indirectly contacted
Number of farm composting sites	20-25	> 25 start-ups/expansions 7 accepting commercial organics
Number of generators reached	60-70 direct contact	> 70
	750-1000 indirect	> 1000 though extensive media coverage and events
Number of generator sites diverting materials to farms	35-40	> 40 (45 at 74 locations)
Number of Extension and other farm assistance agency personnel reached	75-100 region-wide	< 75
Amount of waste diverted	170-377 TPW	175.6 TPW average in final year
Greenhouse gas emissions reduction		5,711 MTCE

Case Studies

This section outlines key aspects of the operations of representative farms, waste generators and haulers:

Farms

Smith Vocational and Agricultural High School Farm
Scantic Farm
Holiday Farm

Generators

Stop and Shop Supermarket Company
Bread and Circus Wholefoods Market
Big Y World Class Markets
La Cazuela Restaurant
Williams College

Haulers

Waste Management
The Master Garbologist
Alternative Recycling Systems
Smith Vocational and Agricultural High School Farm



Smith Vocational and Agricultural High School Farm

The Smith Vocational and Agricultural High School Farm in Northampton is a working farm of 150 acres with dairy, livestock, and feed, vegetable and greenhouse production. The Farm has an educational mission but has to operate as a business because it relies on income from farm activities to fund some or all of its operations as local and state funding waxes and wanes periodically. The Farm has been composting since 1994, and using its current site since 1998. Overall, the composting operation at the Farm has enjoyed a good deal of community support and is a source of local recognition and an important component of its business.

Materials Composted

On and off-farm manure and bedding, and approximately 12 tons per week of food and waxed corrugated cardboard (three truckloads).

Equipment

Smith Vocational used to use a 1986 Dresser 518B articulating loader or a 1968 Hough 30 gas powered loader, and a PTO driven manure spreader. Improvements have been realized through the purchase of a Wildcat CX700 compost turner, which has reduced turning time significantly and aids in plastic trash removal. Prior to using the turner, it took an elapsed time of 2 weeks to process 600 lineal feet of 4' x 4' x 8' windrow with the tractor powered spreader fed by the Dresser 2.5 cubic yard bucket. With the windrow turner, the Farm is now able to turn the same amount of material in about an hour and a half. Screening is performed through a rented 5/16" trommel screen, which is provided with a 5 cubic yard loader and operator. Screening through the fine 5/16" screen has proven necessary to remove small pieces of trash that pass through larger screens.

Economics

The composting operation is a cash source and

net revenue generator for the Farm. Revenues from tipping fees of \$25/ton are about \$7800 annually. The cost for the screening is about \$2.50 per yard, including loader, labor and costs and fuel. This cost is as much as double what some screening services offer, but the value to Smith Farm of having a finer screen and a large capacity loader perform the work was worth the added cost. Screening led to a successful high-grading and selling the material at prices as high as \$30 per cubic yard in bulk. Compost sales are approximately \$13,000 annually.

Challenges

In the past, there has been periodic concern from neighbors, the landlord State agency and regulators over the appearance of the site. Loads brought to the site by the commercial hauler commonly contain store trash (see Scantic Farm case study for description) as well as household trash put into dumpsters if they are not kept locked. Illegal dumping of trash on site occurs several times per year if the gate is left unlocked. The Farm experienced several temporary seasonal shut downs in spring due to muddy conditions and an overflow/backlog of materials after losing some of the farm help. Space constraints put pressure on the Farm to move material off the site in bulk through a broker at a low price of \$2 per cubic yard. In one instance some lower grade compost that had not been screened adequately was sold by a broker to a residential customer (instead of a more appropriate application such as land reclamation) and the customer was unhappy with the quality.

Future Plans

Smith Vocational is in the process of constructing a pad and improving all-weather access on the farm. Tree planting for a visual screen is underway and should be completed by Fall 2000.

For More Information

Tim Smith, Farm Manager (413) 587-1401.



Scantic Valley Farm

Scantic Valley Farm is a 24 acre farm located in Hampden, about 5 miles outside of Springfield. The farm is run on a part time basis, growing pick-your-own strawberries and winter rye. After many years of land applying yard waste from local landscapers, the Farm began composting in 1997, spurred by interest in generating large volumes of organic material needed to rebuild the soil. The site is highly visible from the road and accessible to truck traffic as long as they stay on the marked roadway through the site that is scraped down regularly with the loader blade.

Materials Composted

Leaves and other yard wastes, liquid manures, food, waxed corrugated cardboard and wood chips. The total volume of yard wastes estimated to have been brought in to the site in the past year by 25 commercial landscapers is 3000 cubic yards, and is by volume approximately 60% leaves, 20% grass clippings, and 15% woodchips. Another 5% of the volume is unchipped brush and other tree parts, and sod and dirt from landscape construction jobs. Approximately 15 tons of food and waxed corrugated cardboard are handled weekly, or nearly 800 tons per year.

Equipment

All of the materials handling is performed by two loaders: a 1962 Hough with a 1 cubic yard bucket and a cabless 1963 Michigan 125 with a 2.5 cubic yard bucket. Windblown and surface trash are being recovered with casual labor and effective trash retrieval tools, and innovations such as flatbed wagon-mounted mobile 3 cubic yard dumpster pulled through the field and around the composting site.

Economics

The operation takes in about \$9,000 in tip fees annually. 25 commercial landscapers contribute the

bulk of the volume that comes into the site, and sporadically pay a \$10 tipping fee. The farm charges \$25 per ton for commercial food and cardboard waste. There have been no sales of finished compost to date. According to the farmer, tip fees about cover the costs of the operation.

Challenges

Initially, inadequate amounts of moisture and poor mixing of materials led to incomplete decomposition of the materials accepted. There have been appearance and unsubstantiated odor complaints from neighbors and Town and State officials. The composting site is set back from the road about 600 feet but is within clear view of the road, which has substantial vehicular and pedestrian traffic. When present, trash is visible from the road and blows around into trees and a brushy fenceline. Cardboard in the windrows looks like trash if exposed to view by passersby. Several loads of construction and demolition (C&D) waste and white goods have been illegally dumped on the site by an unknown party. Loads brought to the site from the commercial hauler commonly contain dozens of pieces of trash per cubic yard, which may include glass bottles and jars, metal cans, plastic bags, styrofoam packing boxes, and plastic trays and packing box inserts. Tracking, invoicing and receiving tip fee payments has been difficult.

Future Plans

Scantic Valley's operation lends itself well to direct sales to the same landscapers that drop off materials, though it has yet to do so. There is also a garden center and commercial nursery within a mile of the site that could be wholesale outlets for bulk sales of compost.

For More Information

Chuck Witkop, Farmer (413) 566-3210.



Holiday Farm

Holiday Farm in Dalton (several miles from Pittsfield) is an organic farming operation that raises vegetables, small fruits and cover crops on 1400 acres of sugarbush, managed timber, pasture and hayfields. The farm hosts a 2 acre vegetable Community Supported Agriculture (CSA) operation, and 3 acres are rented out to a daffodil bulb grower. The site where food wastes are being composted is well buffered from neighbors and accessed via an all weather road.

Materials Composted

Annually, 1300 tons of leaf and yard waste from Pittsfield, 300 cubic yards of poultry manure, 750 yards of horse manure and bedding, and 360 cubic yards of dairy manure. The farm receives two packer truck loads of commercial organic waste weekly, comprised largely of food waste by weight but still containing a significant fraction of waxed cardboard by volume. The farm takes in approximately 20-40 tons of commercial waste monthly, or 260-520 tons annually. The Farm also takes in about 400 tons of brush annually, which is kept separate and ground by a contracted service.

Equipment

The farm started out using a 1990 Ford 5610 loader for forming windrows but found it insufficient to the task of forming and turning the thousands of cubic yards of materials brought to the site. In the fall of 1998, the farm bought a slightly used 1998 Caterpillar ITG loader with a 1.75 cubic yard bucket. Pittsfield's leaves are manually debagged with the assistance of a custom built processing rig staffed by two or more seasonal laborers.

Economics

Holiday Farm takes in bagged yard waste from the contracted disposal firm for the City of Pittsfield at \$30/ton. Approximately 20 commercial landscapers tip clean leaves, chips and grass clippings for no fee. Commercial food and

cardboard waste tipping fees have been negotiated at \$500/month to accept food waste that is relatively free of cardboard at a reduced tip fee compared to that for loads that are heavily concentrated with cardboard. Sales of compost from Holiday Farm are priced at \$30/cubic yard for 3/4 inch screened product and about 300 cubic yards was sold to commercial landscapers and local homeowners last year.

Challenges

Neighbor complaints concerning the location and alleged impacts of one of the leaf-only compost areas have been ongoing and may force the relocation of that area. Holiday Farm is seeking to reduce its costs for acquiring nutrients and compostable organics from manure sources by accepting food wastes that are clean and high in moisture content. The farm did not initially want the waxed cardboard but takes it because it must come with the food waste in order to make the program cost-effective for the supermarkets on the route, whose participation, in turn, is required for the route to work for the hauler.

Future Plans

Holiday Farm has just purchased a 10-year old Wildcat turner and will purchase a tractor to run it. The farm anticipates defraying the cost of ownership of the tractor and turner by developing a mobile composting service that could assist other farm composters in the region. Recent and planned modifications to the Farm's operation will enable it to import liquid manures from dairy operations and ice cream. Holiday Farm is interested in selling more compost, and possibly bagging the material for the increased convenience to residential customers and potential product markup and increased revenue per cubic yard.

For More Information

Dicken Crane, Farmer (413) 684-3856.



Stop and Shop Supermarket Company

Stop and Shop Supermarkets, a subsidiary of the Ahold Corporation of the Netherlands, has 204 stores in New England and New York. Stop and Shop is sending organic waste to composting from eleven of its western Massachusetts locations. An initial pilot program at the Northampton store in 1997 proved the program's feasibility, cost-effectiveness and environmental benefits, after which the program was expanded to ten additional locations.

Materials Diverted to Composting

Food waste from produce and deli departments, waxed corrugated boxes from all departments, waste paper. Some locations also divert food waste to pig farmers.

Separation/Collection/Hauling Strategy

The produce manager has the primary responsibility for the program. Employees place food waste in barrels or in small tubs on produce cart shelves. Cardboard is flattened and placed in a wheeled gaylord cart. Employees empty collection containers into 8 yd dumpsters, usually located off of a loading dock. Dumpsters are emptied two times per week.

Quantity Diverted

Stores divert an average of 6 tons per month to composting, which represents approximately 25% of the waste stream with recyclable cardboard and plastic bags removed.

Economics

Participating stores achieve an approximately 10% reduction in overall waste management costs.

Other Benefits

This program has helped Stop and Shop meet its environmental and community objectives, and provided positive publicity through awards and media exposure. Stop and Shop's environmental efforts, including the composting program, have gained attention and recognition from Ahold, which has included program information in its video and print materials distributed internationally.

Challenges

Finding a hauler to provide the service proved to be a challenge in one geographic area. Conditions at some of the compost operations was another concern, but was addressed through the technical assistance provided to farms through the project. Expansion to new market areas with undeveloped infrastructure has been more time intensive than anticipated.

Future Plans

Stop and Shop has started expansion of the program in Rhode Island and Cape Cod, Massachusetts.

For Further Information

David Grestini, Waste Removal coordinator,
1-800-554-5635 x8496.



Bread and Circus Wholefoods Market

Bread and Circus Wholefoods Market, part of the WholeFoods company, caters to both health conscious and gourmet consumers, and sells more produce than the average supermarket. The Hadley store began sending organic waste to composting in 1998, based on a company philosophy that includes environmental stewardship. While the company initiated this program for environmental reasons, it also found significant cost savings once the program was implemented.

Materials Diverted to Composting

Food waste from produce, bakery, bulk foods and deli departments, waxed corrugated boxes from all departments.

Separation/Collection/Hauling Strategy

Each department is responsible for delivering compostable materials to the compactor, which is located in the produce department. Employees place food waste in 40 gallon barrels or in waxed cardboard boxes that will be composted as well. The store uses a 30 yard self-contained compactor for compost and cardboard is not flattened before being placed in the compactor chute. The compactor is emptied usually once a week, on a set schedule to prevent potential problems with materials backing up while waiting before and during a pull.

Quantity Diverted

The store diverts an average 20 tons per month to composting, which represents approximately 50% of the total waste stream (and 68% of the waste stream excluding recyclable cardboard and containers). The store has a combined recycling and composting rate of 75% to 80%.

Economics

The store saves an average of \$687 per month for an approximately 24% reduction in overall waste management costs.

Other Benefits

This program has helped Bread and Circus meet its environmental and community objectives. The program has also been a positive source of employee motivation, especially after the system has remained unchanged for a longer period of time following a series of initial reworkings of the system.

Challenges

Bread and Circus attempted several compost collection designs before arriving at the current one. Before composting, the store had one recyclable cardboard compactor and one trash compactor. The first compost program setup involved using one compactor for compostables, the other compactor for recyclable cardboard, and two dumpsters (8-10 yards each) picked up 2-3 times weekly for trash. The store and hauler originally chose the trash dumpsters to avoid the cost and hassle of installing a third compactor. However, the uncompacted trash, which weighed very little but was very bulky, routinely overflowed the dumpsters. The store then changed to one compactor for trash and collected compostables and recyclable cardboard in the other compactor. However, the compost site was unable to effectively process the large amount of additional cardboard. The final and current arrangement includes three compactors, one each for trash, compostables and recyclable cardboard, and is running smoothly.

Future Plans

Bread and Circus plans expansion of the program in Eastern Massachusetts and Providence, Rhode Island locations.

For Further Information

Karen Lindner, Store Supervisor (413) 586-9932.



Big Y World Class Markets

Big Y World Class Markets is a regional locally owned and operated supermarket company with 46 locations in Massachusetts and Connecticut. Big Y is sending organic waste to composting from 14 of its western Massachusetts locations. An initial program at three stores in the early 1990s was somewhat effective initially, but by 1997 (when CET made contact with the stores) the programs were ineffective and erratically used. Following a retraining of staff and the addition of 3 more stores on a new route, the cost-effectiveness of the program generated a renewed commitment from Big Y management, spurring the addition of another eight stores.

Materials Diverted to Composting

Food waste from produce, bakery and some service deli departments, waxed corrugated boxes from all departments.

Separation/Collection/Hauling Strategy

Each department is responsible for delivering compostable materials to the compost dumpster or compactor, which is usually accessed from a dock or chute in the produce department. Three of the fourteen stores have organics compactors, while the majority use 8 yard dumpsters. Employees place food waste in either barrels, “u-boat” carts, or in small tubs or waxed cardboard boxes on produce cart shelves. Cardboard is flattened at locations with compost dumpsters, and placed in a “u-boat” cart. Employees empty collection containers into 8 yard dumpsters, usually located off of a loading dock. Dumpsters are emptied one time per week, with one store emptied two times per week. Compactors are emptied as needed, on call.

Quantity Diverted

Stores divert an average of 5.1 tons per month to composting, which represents approximately 27% of the waste stream with recyclable cardboard removed.

Economics

Stores save an average of \$138 per month for an approximately 10% reduction in overall waste management costs. Savings achieved at different locations vary widely (from none to 20%) depending on each store’s sales and waste generation volume, product mix and program participation level. The program at all locations saves a total of approximately \$23,000 each year.

Other Benefits

This program has helped Big Y meet its environmental and community objectives, and provided positive publicity through awards and media exposure.

Challenges

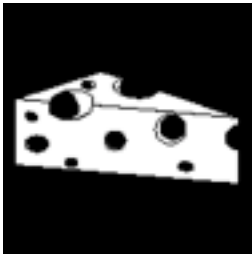
Finding a hauler to provide the service proved to be a challenge in one geographic area. Conditions at some of the compost operations was another concern, but was addressed through the technical assistance provided to farms through the project. Contamination of compost loads was a problem at some locations, but with regular inspections and communication with store and department managers, these problems were overcome.

Future Plans

Big Y has no explicit plans for expansion at this time, but has expressed interest in expanding composting to its Connecticut and central MA stores once a composting infrastructure is established in those areas.

For Further Information

Tony Coppola, Maintenance Manager, (413) 504-4701.



La Cazuela Restaurant

La Cazuela is a 16 year old, 72-seat restaurant serving food (dinner nightly) from Mexico and the American Southwest in Northampton. The working owners have a strong environmental and community commitment which manifests itself in many aspects of their business.

Materials Diverted to Composting

Food prep waste, plate scrapings, paper (napkins, etc) from kitchen and dishwashing areas. No bar or bathroom waste is included and because tables are bussed there is no customer involvement in separation.

Separation/Collection/Hauling Strategy

The organic waste is put it into 30 gallon barrels that are dumped into three 65-gallon totes picked up twice per week. The restaurant washes the internal collection barrels nightly and originally washed the totes weekly until the new hauler began taking care of that. Training the staff is not an issue for the restaurant because the program is institutionalized and they have low staff turnover.

Quantity Diverted

About 550-900 pounds per week from April through October, less in the off season.

Economics

The program has had no economic impact on the restaurant because trash costs are part of the building lease arrangement and paid by the landlord. The building owner's trash costs stayed about the same during the program. The restaurant designed the program to make it easy for employees and a part of normal work, so no additional labor costs have been incurred.

Other Benefits

The program helps meet the restaurant's commitment to the environment and contributes to a high recycling rate. La Cazuela is a member of EPA's WasteWise program. The composting diversion program may have a subtle impact on employee motivation but is not described to them as an environmental effort. The program does not provide a marketing benefit as customers are not told about it.

Challenges

Finding and keeping a hauler to provide reliable service has been the major barrier to the program. The owners tried to start a composting diversion program when the restaurant first opened but found no viable options. In the early nineties they tried again and identified a potential farm site but could not work out transportation. Then, a local farm began a pick-up service and, with help from the owners and city officials, got several local restaurants on board. The pick up proved too much for the local farm, but the now established route was picked up by a local hauler. The hauler provided unreliable service that caused many of the larger restaurants to drop out and the route fell apart. At that point, a small niche hauler took over the route which is still serving the restaurant today.

Future Plans

None, the restaurant is currently recycling and composting all it can as well as buying recycled content products.

For Further Information

Rosemary Schmidt, Co-owner (413) 586-0400.



Williams College

Williams College, located in Williamstown, is a private liberal arts college with 2000 students. Williams has five dining halls serving over 1000 meals per day. Williams has been diverting organic waste through a variety of efforts since 1994. Environmentally concerned students, including a student group called the Purple Druids, were the driving force behind the establishment of a diversion program. In order to build support for the program, the students set out to show that money can be saved by diverting the material from the trash. The first effort was an on-site compost pile serving one dining hall, followed by waste from 3 dining halls being transported by students to a local farm. Williams began diverting food prep waste from all 5 dining halls through a commercial hauler to another farm site in 1998, adding plate scrapings in 1999. 10 student residences with kitchens are also served now.

Materials Diverted to Composting

Food prep waste, plate scrapings, napkins and small amounts of waxed cardboard. Williams also diverts waste from picnics or other outdoor events several times per year, including biodegradable tableware and bags.

Separation/Collection/Hauling Strategy

Kitchen staff and customers in each dining hall are responsible for separating material into the appropriate 28-gallon barrel. When full, kitchen staff put it on the loading dock to await pick-up. Student employees pick up full barrels from all dining halls daily and transport them to a centralized six yard dumpster. The students empty the barrels, wash them out and return them to the dining halls at the next pick-up. The dumpster is emptied twice per week.

Quantity Diverted

Williams diverts nearly five tons of material per week, representing approximately 80% of the dining halls' waste stream by weight.

Economics

Student labor is used to minimize the extra collection costs associated with the decentralized generation of waste from multiple locations on campus. All organics diverted are weighed and the totals are used to attempt to get a rebate from the trash hauler, which does not weigh the trash it hauls for Williams as it charges a set fee per pick-up. Overall, the program costs Williams about \$5000 per year, mostly because the trash hauling contract has not been changed and charges to the College have not reduced significantly.

Other Benefits

Positive publicity and community relations, increased student involvement and awareness.

Challenges

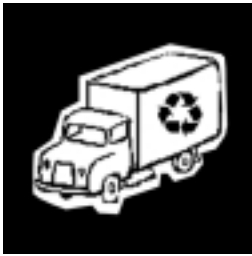
Students involved with the project cited gaining administration support for the program as an obstacle initially. Another big challenge was finding a hauler to pick-up the material. On-site challenges included working with kitchen staff and students to properly separate material for composting. Education and training contributed to a successful program.

Future Plans

Williams has considered composting on-site and a student intern is currently investigating that option.

For Further Information

Tim Reisler, Assistant Director for Administrative Services, timothy.j.reisler@williams.edu, (413) 597-3319 or Brian Werner, Student Intern, brian.m.werner@williams.edu



Waste Management

Two local haulers that began offering organics collection services several years ago were purchased by Waste Management (South Hadley) during the project. Under the direction of the District Manager (who came from one of the original companies), Waste Management combined and expanded those services and is now serving 24 supermarket locations and two food distributors in the area.

Materials Handled

Produce and waxed cardboard.

Collection/Hauling Strategy

Waste Management uses either an EZ Packer or Heil 40 cubic yard front loader compacting truck with 8 yard dumpsters, picked up once or twice per week. The dumpster routes are run over two days and take about 3 hours each. Waste Management also provides two compactor options: Vertipac VIP front load 6 or 8 yard compactors and 24 cubic yard self contained compactors.

Quantity Collected

Waste Management collects an average of 15-20 tons of material per week.

Economics

The volume of the routes are now high enough to make the service cost-effective (break even). The routes will become profitable as the density is filled with additional customers.

Other Benefits

Waste Management believes that composting is an untapped market that will become a big factor in the next few years and is getting into position in the marketplace. The organics route is a value-added service for some of Waste Management's larger customers and helps build customer loyalty. Positive publicity helps their corporate environmental image.

Challenges

1) difficulty in getting clean, uncontaminated material; 2) cost to the customer for the service - it may take a while for the customer to see savings and the program needs to be monitored to make sure enough diversion happens to reduce trash pulls; 3) the reliability of compost sites - haulers need stability in disposal options in order to expand.

Future Plans

Waste Management is considering training its sales force in order to be able to add more restaurants and institutions to the route.

For Further Information

Brian English, District Manager (413) 737-1129.



The Master Garbologist

The Master Garbologist is a refuse and recycling company located in New Marlborough. It has been hauling organic waste since November 1999. Currently, it services six grocery stores, one college and one large institutional yoga center. The Master Garbologist wanted to diversify its hauling business by getting involved with organic waste. Many of its customers are restaurants, and the hauler believes that this service will benefit them by diverting the heaviest material from the waste stream. In addition, the organics service allows Master Garbologist to position itself to expand regular trash service to non-customers.

Materials Handled

Produce, kitchen prep, plate scrapings and waxed cardboard.

Collection/Hauling Strategy

The Master Garbologist uses a Mack 25 cubic yard rear loader compacting truck and dumpsters. To make the service attractive to customers, it offers several different options for service: two cubic yard to six cubic yard dumpsters, and a variety of numbers of pick-ups per week or month. Some smaller waste generators like the flexibility of every other week pick-up to keep costs down. The route generally takes about four hours to run. After the truck dumps the organics, it back hauls commercial and industrial business waste.

Quantity Collected

The Master Garbologist collects five to ten tons of material per week.

Economics

Currently the route is not cost-effective, but is seen as an investment that will pay off as more customers are added.

Other Benefits

The organics service diversifies the hauler's core business and offers existing and new customers a unique niche service. The positive environmental publicity helps their corporate image.

Challenges

Adding customers to the route has been challenging. Smaller customers including restaurants do not want to do the extra work of separation for the same cost of service. It has also been difficult to guarantee material cleanliness to the farmer.

Future Plans

The Master Garbologist would like to expand the route in areas with high customer density.

For Further Information

Karl Ekstedt or Don Clement, (413) 229-3169.



Alternative Recycling Systems

Alternative Recycling Systems (ARS) started four and one-half years ago as a local recycling-only hauler targeting small to medium size businesses, and has since evolved into a full waste management service provider targeting residential and commercial accounts. ARS also provides services for management of special wastes in the Northeast region.

Materials Handled

Food waste and waxed corrugated from restaurants, cotton and paper fiber byproducts, brewery waste (hops).

Collection/Hauling Strategy

ARS uses 65 gallon totes for food collection. ARS first used a rack body dump truck with lift gate to collect the totes and is now using a 16 yard rear loader packer (a Peterbuilt truck with a Leach body) with a cart tipper. The food collection service is a dedicated route (compostables only) that is concentrated in one city (Northampton), and ARS is spending about 10-15 minutes per stop on average.

Quantity Collected

About 4 tons monthly of food wastes from restaurants and brewery; 6 tons monthly of cotton waste.

Economics

The route right now is about a break-even service for ARS. The savings in tip fees are good but there is a significant cost to running a dedicated route. Expansion of the route to include more stops will improve the economics.

Other Benefits

As a smaller hauler without disposal capacity, the ability to control future disposal costs is very important. Also, the program allows ARS to provide a more diverse package of services than some of its competitors.

Challenges

The difficulty with (and time needed for) program set-up and maintenance can be a challenge. Businesses that are less dedicated to the idea, less well-run, and/or have higher employee turnover require ongoing maintenance to avoid contamination.

Future Plans

ARS is considering expanding the organics route to existing customers and others in nearby towns.

For Further Information

Patrick Kennedy, President (413) 634-8000.

Lessons Learned

Through the course of the project, CET learned many important lessons that could be helpful to others in designing and implementing similar efforts.

Overall Approach

Market-Based

This approach worked because it provided participants with the motivation to advocate for and oversee change in their business practices. Many participants were also (or even primarily) motivated by other factors including environmental stewardship or public/government relations, but would not have been able to participate without the economic incentive. Another benefit of this approach was that the business relationships that were formed among participants are sustainable without ongoing project assistance, and set the stage for expansion/growth through self-initiated efforts which are presently occurring.

Targeted

The development, implementation and maintenance of efficient collection, delivery and composting systems required significant outreach and technical assistance to farmers and waste generators. A substantial amount of technical assistance to composters and waste generators was also needed to ensure activities met environmental, regulatory and community standards and resulted in clean, appropriate organic materials being processed and used on area farms. Haulers needed little technical assistance but required a good deal of outreach and facilitation to enlist their participation, which was critical to the project.

Decentralized and Long-term

This approach worked because it minimized risks for participants and provided adequate resources to address the nearly constant fixes and readjustments to the system that were needed as it was developed. For example, during the project there were instances of temporary and permanent shut-downs and drop-outs of composters, haulers and waste generators for a variety of reasons described below in individual sections covering each market sector.

Farm Composters

Composting can be a viable side business and revenue source for farms. Income from tip fees and compost sales provide cash and net revenue to the farm. Use of the finished product on the farm can help the farmer avoid some of the costs associated with purchase of organic matter and/or nutrient sources. Composting helps the farmer diversify business operations.

Composting of commercial waste must fit into the farm operation and requires a high degree of maintenance. To accept commercial materials, farms need to be open year-round, promptly attend to commercial organics and be vigilant in keeping out contamination.

The most likely candidates for composting are farms that have a need for the finished product and/or a need to manage farm wastes. Farms without their own source of manures or other feedstocks must ensure adequate sources of other materials to create a successful recipe.

Higher levels of management are required as deliveries of commercial organics increase in frequency and/or volume. Problems can develop fairly quickly if any resource (time,

equipment, bulking material, etc.) or environmental condition (season, weather, etc.) limits processing of incoming materials in a timely manner. In addition, the potential for nuisance conditions (odors, vectors, litter, etc.) correspondingly increases with the amount and frequency of deliveries.

Compost sites shut down, either temporarily or permanently, for several reasons. One site shut down for several months due to muddy site conditions and an overflow of incoming materials. Neighbor or regulatory issues temporarily closed or limited capacity at other sites on several occasions. One site shut down permanently due to difficulty in tracking tonnages and collecting payments from haulers, the slow composting time of unprocessed cardboard and lack of adequate nitrogenous materials to create a successful recipe.

Farmers can successfully compost smaller amounts of commercial organic waste with existing farm equipment and may benefit from specialized equipment as operations grow.

Composting food and waxed corrugated cardboard takes extra attention but is possible without grinding or specialized equipment. Most of the participating farms reach a “comfort level” using existing farm equipment (bucket loaders, manure spreaders, etc.). As volumes of materials process increase beyond

this, farms desire access to specialized composting equipment (windrow turners, screeners) to manage composting operations at optimum levels. This need arises from a desire to speed up the composting process and minimize labor inputs.

Farmers must avoid visual impact of the materials on neighbors and passersby. Neighbor complaints, often leading to regulatory visits, were a big challenge to compost operations. Most complaints, even “odor” complaints, were generated by appearance of site. Site appearance problems include plastic contamination, too much visible waxed cardboard (even though not a contaminant), or packer truck deliveries causing concerns from uninformed residents.

Farmers need to allocate time and resources to deal with contaminants by picking plastic and screening finished compost. Some amount of contamination of commercial loads with plastic packaging was unavoidable, even with intensive training of generators. Farmers need to pick plastic and other contaminants from loads as they arrive and periodically through the composting process as organic materials reduce in size and inorganics rise to the surface of the windrow.

Compost quality and sales worthiness were generally quite high if a proper recipe and fine screening of end-product were used. Some farmers produced poor compost if they lacked adequate feedstocks to balance large amounts of dry cardboard. Farmers needed to use a fine screen (5/16" or 1/2") in order to remove smaller contaminants including twist ties, rubber bands, etc that were introduced with the commercial food waste. Fine screening compared to courser (3/4" and up) improved the market value of the compost from \$2/yard bulk sales for land reclamation use to \$25-\$30/yard for retail sales.

Many farms can compost farm materials only (e.g., manures and bedding) or accept easier to manage materials including leaves or landscaping waste as appropriate. Only a small percentage of initially interested farms actually ended up successfully composting commercial organic waste. Many others were able to successfully compost manures and leaf and yard waste. Contamination levels of 1-5% inorganics (primarily plastic) deterred many farmers. The increased management demands for food and cardboard waste, and/or in serving commercial haulers continuously and year-round, were another deterrent.

Key Points for Farm Composters

- Composting can be a viable side business and revenue source for farms.
- Composting of commercial waste must fit into the farm operation and requires a high degree of maintenance.
- Farmers can successfully compost smaller amounts of commercial organic waste with existing farm equipment and may benefit from specialized equipment as operations grow.
- Farmers must avoid visual impact of the materials on neighbors and passersby.
- Farmers need to allocate time and resources to deal with contaminants by picking plastic and screening finished compost.
- Many farms can compost farm materials only (e.g., manures and bedding) or accept easier to manage materials including leaves or landscaping waste as appropriate.

Waste Generators

Larger waste generators can save money by diverting source separated organic waste to composting. Supermarkets and institutions reduced overall waste management costs by 10-25% through the program. The extra costs of a separate organic waste container, hauling service, compost tip fees and separation labor must be offset by the difference in the trash and compost tip fees and by reduced trash pulls (see Appendix I for sample savings calculations).

Most small restaurants were not able to save money through composting because of the high collection costs for a relatively small volume of material. Several larger restaurants that used garbage grinders were also not able to save money through composting because of the ability to send the majority of their organic waste into the sewer system at no additional cost.

CET did not target outreach to restaurants, so participation was lower than might be expected if they had been targeted. Those that did participate were highly motivated, usually for environmental reasons, and seemed willing to pay equal but not higher waste costs to compost. Programs for small restaurants that are initiated by the hauler (as opposed to a third party) as a standard service may be more likely to succeed. The effort could be marketed as a way to keep costs from rising instead of as a way to provide cost reductions.

Key Points for Waste Generators

- Larger waste generators can save money by diverting source separated organic waste to composting.
- Direct outreach with a focus on cost savings is most effective in facilitating business participation.
- Public and regulatory relations are other important motivating factors for businesses.
- Many of the commonly cited barriers to separation and collection can be overcome if the economics work and there is a strong commitment from management.
- Contamination caused by improper separation can be minimized but not eliminated.

Direct outreach with a focus on cost savings is most effective in facilitating business participation. This project confirmed CET's experience that direct telephone contact and site visits to businesses and haulers were more effective than sponsoring local meetings or workshops. Business owners and operators are used to receiving information in the "sales call" format and often do not typically allocate time to attend local workshops other than the usual Chamber or Rotary meeting.

It was most effective to solicit participation from owners or upper management first, with a focus on cost savings as well as risk avoidance and ease of implementation. After buy-in at that level, it was critical to work closely with middle management and store employees to ensure they were supportive and that separation procedures were well-designed and implemented.

Public and regulatory relations are other important motivating factors for businesses. Positive publicity is a valuable benefit for consumer companies and provided motivation to businesses and institutions to participate or expand activities. Many larger corporations or institutions have environmental goals and/or public reporting mechanisms that can be helped through a composting diversion program. Publicity provides less of a motivation to wholesale/distribution companies that do not directly serve the public consumer. Regulatory relations including site visits and awards from government agencies are important motivators for all participants.

Many of the commonly cited barriers to separation and collection can be overcome if the economics work and there is a strong commitment from management. A high priority was placed on simplicity of operations in order to increase the likelihood of recruiting and keeping participants. Often designing a separation system was no more complicated than adding another barrel and a few simple signs. Once or twice weekly collection was adequate for dumpster routes and compactors might go every one or two weeks, all without additional odor problems. Training usually involved one meeting with front line managers to review the program, after which they would explain it to employees on the job. If it was clear that management supported the program, employees made it a part of their everyday activities.

Space constraints outside the back of the store were sometimes a real barrier. On several occasions the lack of a good location for the placement of an

additional hauling container prevented participation. Security issues precluded some stores from participating because of a prohibition of employees opening the back door, which is required if a container cannot be accessed off of a dock or through a chute in the wall. Other stores did not view the back door access as a security problem and were able to develop programs accordingly.

Contamination caused by improper separation can be minimized but not eliminated. Most waste generators were able to do a decent job in source separation with minimal training if management support for the program was strong. However, even the best performers still diverted materials with a minor amount of contamination, which has to be dealt with at the farm. Several waste generators had repeated contamination problems, either due to lack of management commitment, staff turnover or seasonal busy periods, that required increasingly intense assistance to overcome. It may become necessary for farmers to raise tip fees for dirtier loads or to more aggressively reject loads in order to increase the incentive to source separate properly.

One major waste generator that was an original “anchor” of the program discontinued the program after several restarts due to low diversion and high contamination rates that resulted in rejected loads. The resulting waste management savings (about 25%) were not important enough to motivate the very large business to participate in a composting diversion program, because the total dollar amount saved was small compared to total operational costs.

Waste Haulers

Selling the program to the waste generators so they will request the service from their current hauler is an effective initial strategy to enlist hauler participation. Most haulers initially expressed interest in providing organic waste collection services. However, in practice it was difficult to convince haulers not offering the service to begin doing so or to convince haulers already offering the service to enlist more of their customers. Haulers were most responsive to the project if their customers (especially large ones) specifically asked for organic waste collection services.

It was helpful to recommend that waste generators try to work with their current hauler first, for two reasons. First, that policy helped to build trust between project personnel and haulers because the project was seen not to be helping any particular

hauler in taking customers from another. Second, the policy avoided contractual difficulties caused by contract clauses stipulating that the hauler has control over all of the waste generated by the customer. In practice, if the current hauler had been given the option but did not want to provide the service (and wanted to have any hope of renewing the contract), it would need to allow another hauler to do so.

Once haulers made a commitment to proceed they were creative, cooperative and appreciative participants. As participation continues to increase, haulers are beginning to initiate new efforts on their own, without prior direct marketing by CET to their customers.

Once customer demand exists, collection efficiencies and long-term access to compost sites are essential to haulers. Haulers were open to providing the service if the economics were feasible and they felt confident about convenient, long-term access to farm composting sites. Haulers generally did not need technical assistance in equipment selection or other aspects of their business.

Maximizing transportation efficiencies was a critical aspect of this project and is essential for the longterm success of the composting industry. To start a new dumpster route, it was necessary to enlist a critical mass of customers before a hauler would be willing to pick up the route. Alternatively, it was occasionally possible to subcontract organics collection to one hauler so that nearby organics stops from several haulers could be combined to more efficiently fill a truck. Large waste generators that could justify and fit a compactor for organics could start on their own. Another important factor

Key Points for Waste Haulers

- Selling the program to waste generators so they will request the service from their current hauler is an effective initial strategy to enlist hauler participation.
- Once customer demand exists, collection efficiencies and long-term access to compost sites are essential to haulers.
- Changes in the hauling industry (vertical integration, consolidation) can harm or help efforts to divert organic waste.
- A good system is needed for record-keeping and review of billing and payments to avoid problems.

was the hauler's reading of the growth potential of this type of service.

Changes in the hauling industry (vertical integration, consolidation) can harm or help efforts to divert organic waste. Vertical integration of the waste industry (waste companies owning both hauling services and disposal sites) can affect the source separated organics market. Small haulers that do not own disposal capacity want disposal alternatives to help lower tip and travel costs and stay competitive. Integrated companies may have an economic disincentive to divert materials from their disposal site unless the input rate to their facility is limited by regulation or other factors.

During this project, consolidation in the hauling industry increased route efficiencies by combining smaller routes previously operated by separate haulers. However, this benefit occurs only if the service is offered by the new company (as it was in this case). In other cases, new priorities and/or uncertainty stemming from a recent or impending takeover prohibited haulers from considering new, or starting planned, organic waste collection activities.

A good system is needed for record-keeping and review of billing and payments to avoid problems. Tracking tonnages and payments between multiple generators, haulers, and composting sites was an important role for CET as participants were helped to develop their own tracking systems. Discrepancies (unintentional and intentional) in tip fees paid to farm composting sites and invoices charged to businesses can occur without this kind of third party intercession or diligent tracking and invoicing by farmers and businesses. Problems in billing/paying can reduce the savings of waste generators or the income of farmers.

Appendices

A. Initial Mailings

Waste Generators
Farmers
Haulers

B. Handouts on Services Available

Farms
Waste Generators

C. Media Event Agenda

D. Twilight Meeting Agenda

E. Compost Test Form

F. Contract between Farmer and Hauler

G. Letter to DEP regarding Compliance at Farm Site

H. Equipment Survey Materials

I. Waste Generator Cost Tracking Spreadsheets

J. In-store Separation Procedures and Signs

K. Close-out Letter

Waste Generators
Haulers

L. MA DFA Exemption Language and Registration Form

M. Selected Media Articles

N. Project Budget and Staffing Information

O. Climate Change Impact Calculation Methodology

P. Other Materials Available

Q. Other Helpful Resources

Appendix A. Initial Mailing to Waste Generators

Date

Address

Dear WASTE GENERATOR:

Thank you for speaking with me yesterday regarding your interest in our on-farm composting project. The Center for Ecological Technology (CET) is a non-profit organization which has been active in the fields of energy and resource conservation since 1976. As part of a grant funded program, CET is linking interested organic waste generators throughout Franklin, Hampshire and Hampden Counties with local farmers who are accepting pre and post-consumer organic waste for composting.

I have enclosed some background information on our organization to help you become more familiar with the services we offer to the public and private sectors. I have also included some articles pertaining to farm composting of source separated organic materials. Big Y Supermarkets and Hannaford Brothers (Shop and Save) are both mentioned in these articles as supermarket chains that have adopted source separation of organic materials for economic and/or ecological reasons.

Farm composting of source separated organic materials including fruits, vegetables and waxed cardboard (as well as leaf, yard waste and manures) is supported by the Department of Food and Agriculture (DFA) and the Department of Environmental Protection (DEP) as a viable alternative to incinerating or landfilling. This process can be instituted through your current hauler and allows your company to save money through reduced tip fees (typically around \$25.00 per ton at the farm compared to approximately \$65.00 per ton at the local landfill), provides farmers additional income and is an environmentally friendly and effective disposal alternative. This process also diminishes the amount of leachate normally associated with the direct application of manures to farm fields, thus reducing the contamination of local water sources.

CET is assisting local farmers in completing a simple state registration process so they are eligible to receive source separated organic materials from off-farm generators. We would like to work with your company in an effort to divert as much source separated organic material as possible from your store locations to these registered farms.

To accomplish this process, CET offers the following services at no charge:

- supply your hauler with a list of local farmers who are registered to accept source separated off-farm organics.
- help further reduce your disposal expenses by registering additional farms near your participating store locations.
- meet with each store's management team to explain the benefits of organics separation.
- assist your store management teams with training personnel in the set up and maintenance of a suitable source separation system to ensure clean loads of organics.

- furnish your company with the names of suppliers who specialize in source separation products (indoor toters, steam cleaners, etc). Please note that successful source separation does not require additional fixture expenses, but specialized products are available upon request.
- serve as a liaison between your company and the farmer(s) your hauler chooses to use to help ensure easy access to drop sites, set up drop off schedules, etc.
- quality control inspections of the separated materials to ensure the least amount of contamination possible.

Please note these services are available free of charge to any interested farmer, hauler and/or waste generator in Franklin, Hampshire and Hampden Counties. Our mission is to increase the amount of source separated organic material being diverted to local farms. CET is not responsible for any arrangements, pricing, payments, or obligations created between the cooperating parties, nor is CET liable for material quality or quantity. CET will make every effort to serve all interested participants equally and without bias.

If you have any questions regarding the enclosed information please feel free to contact me at (413) 586-7350. I look forward to working with your company and thank you for your efforts.

Sincerely,

Solid Waste Specialist

enclosures

cc: Hauler

Appendix A. Initial Mailing to Farmers

Date

Dear Farm Bureau Member,

I would like to make you aware of an income-producing opportunity available to farms in Massachusetts. Currently some farmers in our state are charging waste haulers a “tip fee” of approximately \$25.00 per ton to accept loads of pre-sorted organic material consisting of fruits, vegetables and waxed cardboard for composting. Farmers are also collecting a lower tip fee to accept and compost manures, wood shavings, bedding materials, leaves, etc.

While pricing varies depending on the location, frequency and quantity of the material being received, this program allows the farmer to be paid for accepting a potentially beneficial raw material. This raw material can be blended and composted with manures and other farm wastes to create a high quality soil amendment for use on-farm or for sale in bulk or bag for additional income. On-farm composting also diminishes the amount of leachate normally associated with the direct application of manures to farm fields, thus reducing the contamination of local water sources.

The Center for Ecological Technology (CET) is a non-profit organization which has been active in the fields of energy and resource conservation since 1976. CET is currently helping area farmers with their composting efforts through a program funded by the United States Department of Agriculture (USDA) and local foundations. Farm composting of appropriate source separated organic materials is supported by the Department of Food and Agriculture (DFA) and the Department of Environmental Protection (DEP) as a viable alternative to incinerating or landfilling.

Farmers must register with the state to become eligible to receive source separated organic materials from off-farm organic generators. The registration process is free of charge and consists of a three page form and a site visit by a DFA representative. I would like the opportunity to work with you in an effort to register your farm with the State. I can also provide you with information and resources to learn about composting off-farm source separated organics and/or on-farm compostables such as manures and bedding materials.

I can then link your farm with waste haulers and generators who are interested in participating in this program and continue to assist you by answering any questions that may arise during the process. There is no charge for our assistance and you would also be encouraged to contact waste haulers and generators to create a flow of material to your location.

CET offers the following services to any interested farmer, free of charge:

We will:

- supply you with current information on farm composting and referrals to technical personnel, testing and trouble shooting.
- provide you with additional information on farm composting as it becomes available.
- add your name to our list of local farmers who are registered to accept source separated off-farm organics and make this list available to local haulers and organic waste generators.
- supply training to waste generator employees to ensure the least amount of contamination possible.

- furnish you with the names of suppliers who sell or rent composting apparatus such as thermometers, testing equipment, screeners, baggers, etc.
- provide quality control inspections of the separated materials to ensure the least amount of contamination possible.

Please note that these services are available free of charge to any interested farmer, hauler and/or waste generator in Franklin, Hampshire and Hampden Counties. Our mission is to increase the amount of source separated organic material being diverted to local farms. CET is not responsible for any arrangements, pricing, payments or obligations created between the cooperating parties or for material quality or quantity. CET will make every effort to serve all interested participants equally and without bias.

If you have interest in this project or are already involved in organics diversion and want to expand the process, please contact me at (413) 586-7350 or (800) 369-3333. I am available for appointments Monday through Thursday, or upon request.

Sincerely,

Solid Waste Specialist

Appendix A. Initial Mailing to Haulers

Date

Dear HAULER:

We would like to offer your company a free service that could save you money and will help support the local agricultural community. As part of a grant funded program, the Center for Ecological Technology (CET) is linking interested haulers throughout Franklin, Hampshire and Hampden Counties with local farmers who are accepting pre and post-consumer organic waste for composting. This process allows generators and haulers to save money through reduced tip fees (typically around \$25.00 per ton), provides farmers additional income and is an environmentally friendly and effective disposal alternative.

CET is a non-profit organization which has been active in the fields of energy and resource conservation since 1976. Farm composting of source separated organic materials including waxed cardboard, fruits and vegetables (and leaf, yard waste, and manures at a further reduced tip fee) is supported by the Department of Food and Agriculture (DFA) and the Department of Environmental Protection (DEP) as a viable alternative to incinerating or landfilling. CET is working with local farmers to assist them in completing a simple state registration process so they are eligible to receive source separated organic materials from off-farm organic generators. We would like to work with your company and your customers in an effort to divert as much source separated organic matter to area farms as possible.

To accomplish this process, we offer the following services at no charge. CET will:

- supply your company with a list of local farmers who are registered to accept off-farm organics.
- meet with your interested customers (supermarkets, restaurants, produce houses, etc.) to explain the benefits of organics separation.
- assist your customers as needed in setting up and maintaining separation systems to ensure clean loads of organics.
- supply you and/or your customers with the names of suppliers of compostable plastic bags, steam cleaners, toters, indoor collection containers and any other materials required to make this process successful.
- help meet your disposal needs by registering farms near your participating customers.
- serve as a liaison between your company and the farmer(s) you choose to use to help ensure easy access to drop sites, set up drop off schedules, etc..
- provide you with help and information about other successful commercial organics programs.

Please note that these services are available free of charge to any interested farmer, hauler and/or waste generator in Franklin, Hampshire and Hampden Counties. Our mission is to increase the amount of source separated organic material being diverted to local farms, but we have no influence over pricing or contractual arrangements made between parties. Additionally, we will make every effort to serve all interested parties equally and without bias.

If you have interest in this project or are already involved in organics diversion and want to expand the process, please contact me at (413) 586-7350. I am available for appointments Monday through Thursday, or upon request.

Sincerely,

Solid Waste Specialist

Appendix B. Handouts on Services Available - Farms

CET's Farm Composting Program Services Available to Farms

CET can provide extensive, free technical assistance to farmers throughout western Massachusetts to initiate or to expand on-farm composting of agricultural and/or commercial organics. CET offers customized approaches for farms, which may include the following services:

- supply up-to-date information on farm composting
- provide on-site technical assistance on composting materials/methodology, equipment, testing, marketing and/or use of end product
- supply pre-paid mailers for compost testing services
- furnish the names of suppliers who sell or rent specialized composting equipment including thermometers, testing equipment, screeners and baggers and coordinate cooperative use of equipment among farms to obtain the best value
- assist in the registration process with the Department of Food and Agriculture (DFA) to obtain eligibility for accepting off-farm organics for composting
- play a proactive role with municipal boards, committees and departments to provide information about farm composting, including DFA registration and DEP regulations
- maintain lists of local farmers who are registered to accept source separated off-farm organics and make this information available to local haulers and waste generators
- provide organics separation training at participating businesses and institutions to ensure the least amount of contamination possible
- perform quality control inspections of source-separated materials to ensure minimal contamination levels
- obtain documentation of tons diverted, perform on-site weighing of test loads
- assist with cost-benefit reviews

**For more information, contact John Majercak at 413-586-7350
Toll free 800-369-3333 - Fax 413-586-7351 - EMail cetnoho@aol.com
The Center for Ecological Technology
26 Market Street
Northampton, MA 01060**

Appendix B. Handouts on Services Available - Waste Generators

CET's Farm Composting Program Services Available to Businesses and Institutions

CET can provide extensive, free technical assistance to help your organization save money by using your current waste hauler to send food residuals, waxed cardboard, and other organic waste materials to local farms for composting in western Massachusetts. Cost savings are derived from reduced tip fees (up to 60%) and reduced trash pick-ups (up to 50%). In addition, significant public relations and environmental benefits can be realized.

CET can offer the following services to your organization at no charge:

- supply your current waste hauler with a list of local farmers who are currently registered to accept source-separated commercial organics
- meet with your management team to explain the benefits of organics separation
- assist in the design and set-up of a suitable source separation system
- train management and employees in maintaining the collection system to ensure clean loads
- serve as a liaison between your waste hauler and the farm composting site to facilitate easy access, convenient delivery schedules, etc.
- perform quality control inspections of source-separated materials to ensure minimal contamination levels
- obtain documentation of tons diverted, perform on-site weighing of test loads
- assist with cost-benefit reviews
- facilitate community/governmental relations and other promotional activities
- provide "the only number you need to call" for questions or problems

For more information, contact Jim Desmond at 413-586-7350

Fax 413-586-7351 - EMail cetnoho@aol.com

The Center for Ecological Technology

26 Market Street

Northampton, MA 01060

Appendix C. Media Event Agenda

Agenda

- Welcome- Peter Fiore, Facility Director, C&S Wholesale Grocers, Inc.
- Laura Dubester, Director, Center for Ecological Technology
- John P. DeVillars, Administrator, EPA New England
- Jonathan Healy, Commissioner, MA Department of Food and Agriculture
- William Gouzounis, Assistant State Director, USDA Rural Development
- James Gardiner, Program Manager, USDA SARE Program
- Sam Wolman, Director of Manufacturing, The Stop and Shop Supermarket Company
- Tour- Joseph Covington, Resourceful Waste Coordinator, C&S Wholesale Grocers, Inc.
- Question and Answer Session
- Thank You and Close - Peter Fiore, C&S Wholesale Grocers, Inc.
- Refreshments (10:45-11:15)

Interview/Photo/Film/Recording Opportunity and Tour:

11:30-noon	Stop and Shop Supermarket, 228 King Street, Northampton
12:15-12:45	Smith Vocational School Farm, Burts Pitt Road, Northampton

Directions to Stop and Shop and Smith Farm

To Stop and Shop from C&S: At exit go left on North Hatfield Street. At stop sign, go left (south) on Route 5. Take Route 5 into Northampton, Stop and Shop is on the right.

To Smith Farm from Stop and Shop: Take a right on King Street (Route 5) to the major intersection in Northampton. Go right on Main Street (Route 9). Go left on Route 66 (west). Go right at fork in road, on to Prince Street West, which turns into Burts Pitt Road. Look for compost windrows and greenhouse on the left.

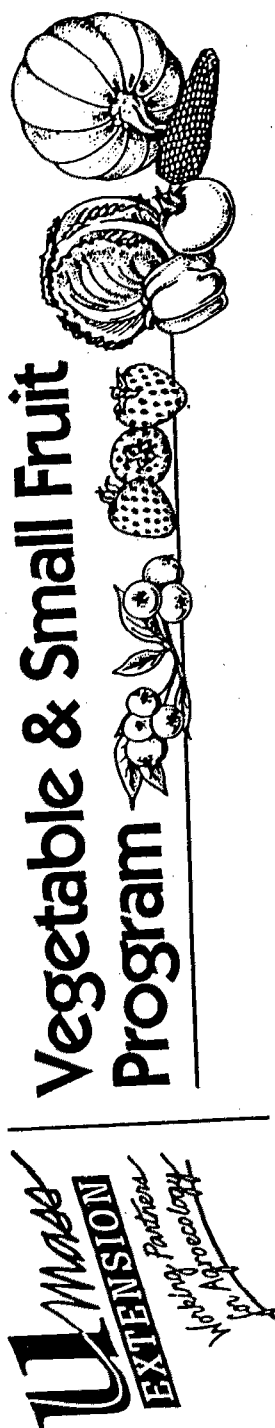
Appendix C. Media Event Agenda, Continued

Working Agenda

9:40	Welcome, Introduction of Laura Dubester - Peter Fiore, Facility Director, C&S Wholesale Grocers, Inc.
9:43	Remarks, Introduction of John P. DeVillars, Administrator EPA New England - Laura Dubester, CET
9:45	Remarks- Administrator DeVillars
9:55	Introduction of John Majercak, Director, Solid Waste Programs, CET - Laura Dubester, CET
9:55	Introduction of Jonathan Healy, Commissioner, MA Department of Food and Agriculture - John Majercak, CET
9:55	Remarks - Commissioner Healy
10:00	Introduction of William Gouzounis, Assistant State Director, USDA Rural Development - John Majercak, CET
10:00	Remarks - Assistant Director Gouzounis
10:05	Introduction of James Gardiner, Program Manager USDA SARE Program - John Majercak, CET
10:05	Remarks- James Gardiner
10:10	Introductions of program participants attending - John Majercak, CET
10:10	Introduction of Sam Wolman, Director of Manufacturing, The Stop and Shop Supermarket Company - John Majercak, CET
10:10	Description of Stop and Shop composting efforts - Sam Wolman, The Stop and Shop Supermarket Company
10:15	Introduction of Joe Covington, C&S - John Majercak, CET
10:15	Tour and Description of C&S Composting efforts - Joseph Covington, Resourceful Waste Coordinator, C&S Wholesale Grocers, Inc.
10:35	Question and Answer Session
10:45	Thank You and Close- Peter Fiore, C&S Wholesale Grocers, Inc.
10:45	Refreshments
11:15	End

For Media Representatives:

11:30-noon	Stop and Shop Supermarket, North King Street, Northampton - Tour and Photo/Film/Recording opportunity
12:15-12:45	Smith Vocational School Farm, Northampton - Tour and Photo/Film/Recording opportunity



1998 Summer Twilight Series on Massachusetts Vegetable & Small Fruit Farms

This summer's series of five twilight meetings will feature blueberries and grapes, butternut squash and pumpkins, Latino crops that are new to Massachusetts, and heirloom tomato varieties. We will also focus on bird and deer management, a challenging issue for many growers in the state. This a great opportunity to see other farms, talk with other farmers and agricultural specialists, and get new ideas to improve your own operation.

All meetings are on Tuesday evenings. Note exact starting time (5:00, 5:30 or 6:00 P.M.) for each meeting!

****Each meeting will offer one hour of pesticide applicator recertification credit.****

Tuesday, July 7, 6:00 – 8:00 PM

Four Rex Farm, Hadley

Hosts: Ray and Dee Rex

Co-sponsored by the Center for Ecological Technologies (CET)

Four Rex Farm grows 124 acres sweet corn, tomato, peppers and squash near the Connecticut River in Hadley, and sells wholesale to roadside stands all over New England.

On-farm composting. Four Rex Farm has recently set up a windrow composting system with cardboard and produce waste from nearby supermarkets and produce distributors. They plan to use the compost to build up light soils on their farm. Ray and Dee will talk about the whys and hows of their system. Compost specialists from CET and other organizations will be on hand for questions.

Compost Testing

In cooperation with the Center for Ecological Technology, the University of Massachusetts Soil & Plant Tissue Testing Laboratory will provide the following tests at no cost.

- Moisture Content
- Bulk Density
- pH
- Soluble Salts
- Available Plant Nutrients
- Extractable Heavy Metals
- Total Nitrogen
- Organic Matter
- Carbon/Nitrogen Ratio.

Why Test?

- to improve the soil's nutritional balance
- to help assess product stability
- to judge best use for compost
- to aid in the diagnosis of plant culture problems
- to modify future composting plans
- to identify composts contaminated with heavy metals

A compost test can be a valuable tool in assessing and preventing horticultural, agronomic, and some environmental problems. The tests listed above do not identify plant growth problems associated with soil drainage, insects, plant diseases (whether soil-borne or not), weeds, winter injury and the misuse of pesticides.

The University of Massachusetts Soil and Plant Tissue Testing Laboratory also offers nutrient and heavy metal testing of soils, plant tissue and soil amendments.

UMass Extension Newsletters

Hort Notes... for professional landscapers and grounds managers; \$15.00/year (8 issues), for subscription information contact Kathleen Carroll, (413)545-0895.

Turf Notes... for professional turf and grounds managers; \$15.00/yr (6 issues); for subscription information contact Mary Owen, (508)892-0382.

Floral Notes... for professional flower growers; \$15.00/yr (6 issues); for subscription information contact Doug Cox, (413)545-5214.

Crops, Dairy, Livestock News... covers topics in crops, feeds, and nutrient management; published quarterly; for subscription information contact Steve Herbert, (413)545-2250.

Tree Fruit Newsletter... for professional tree fruit growers; \$35.00/yr (published monthly); for subscription information contact Karen Hauschild, (413)545-5304.

Vegetable Newsletter... for commercial vegetable growers; \$30.00/yr (6 issues Veg. Notes; 20 issues Veg. Pest Message); for subscription information contact John Howell, (413)545-5307.

Small Fruit Newsletter... for commercial small fruit growers; \$25.00/yr (12 issues newsletter; 10-12 issues Small Fruit Pest Message); for subscription information contact Sonia Schloemann, (413)545-4347.

U Mass

*Soil & Plant Tissue
Testing Laboratory*

Compost Analysis

PREPAID by

The Center for Ecological Technology's

On-Farm Composting Project

**Funded by a Grant
from USDA-SARE**

Issued by UMass Extension, in furtherance of the Acts of May 8 and June 30, 1914; United States Department of Agriculture and Massachusetts counties cooperating. UMass Extension offers equal opportunity in programs and employment.

About the Center for Ecological Technology (CET) and the On-Farm Composting Project

A non-profit organization established in 1976, the Center for Ecological Technology (CET) works as a catalyst for changing solid waste and energy practices which adversely impact the natural ecology of the earth. CET demonstrates and promotes practical applications of sustainable technologies, providing solutions that serve the entire community.

The On-Farm Composting Project was initiated in October 1996, with funding from the USDA Sustainable Agriculture Research and Education program (SARE), the EPA Region I Climate Change Action Program, and several local foundations.

The purpose of the project is to develop and implement an economically and environmentally sustainable market-based system for on-farm composting of commercially and agriculturally generated organic materials.

The project's major tasks are to:

- provide direct outreach, education and assistance to farmers, organic waste generators, and waste haulers in order to generate interest and participation in farm composting
- develop the necessary connections and infrastructure for participants to succeed; and
- document and disseminate information about farm composting to a growing circle of participants and agencies throughout the region

For more information, contact Karen Bouquillon or John Majercak at 413-586-7350.

Compost Sampling

The compost sample must be representative of the whole compost lot or some section of interest in the lot. To ensure this:

- Inspect the pile and choose several representative sample sites.
- Place trowel size samples (taken from 12 inches within the pile at each of those sites) in a large container and mix thoroughly.
- Place one quart of the mixture in the zip-lock type plastic bag provided and seal.
- Label outside of bag clearly with your name and a sample ID.
- Complete order form.
- Mail or deliver the sample to the lab without delay. Otherwise, store sample frozen until delivery is possible.

Ordering Information

Fill out the order form and place in the preprinted envelope with sample.

One sample per envelope, please.

Test

Fee

Standard Compost Test

~~prepaid~~

Where to Send Order

Please return the completed order form with your compost sample to:

Soil Testing Lab
West Experiment Station
University of Massachusetts
Amherst, MA 01003-2082

For more information, call the Soil Testing Lab at (413) 545-2311.

Email: soiltest@umext.umass.edu

Web: <http://www-unix.oit.umass.edu/~soiltest/>

Order Form 000059

Please complete the questionnaire below.

Sample Information

One sample per envelope please.

Sample ID: _____

Starting Materials: _____

Compost Age: _____

Composting Method: _____

Intended Use: _____

Comments: _____

Fill in the following:

Name: _____

Address: _____

City/State: _____

Zip Code: _____ Date: _____

Appendix F. Contract between Farmer and Hauler

ORGANIC WASTE CONTRACT

This **AGREEMENT** made as of [date] _____, between [customer] _____ [herein called "**GENERATOR**"] and [farm name], _____ [herein called farm "**COMPOSTER**"] with a principal mailing address at _____.

DEFINITIONS:

Organic Wastes

Discarding biodegradable materials produced from the sorting, processing, storage and shipping of food products. For the purpose of this contract organic wastes include all fruits, vegetables, baked good, floral products, waxed cardboard and wet or soiled old corrugated cardboard. Organic Wastes must not contain more than five (5) percent by volume of non-organic waste material.

Source Separation

The physical separation of Organic Wastes from all other materials performed at the waste generator.

WITNESSETH:

WHEREAS the **COMPOSTER** is a farm engaged in the business of composting Organic Wastes to produce soil amendments, and;

WHEREAS the **GENERATOR** is interested in reducing costs by recycling only their organic wastes;

1. Disposal and Processing of Organic Wastes

The composter agrees to accept for processing from the **GENERATOR** and the **GENERATOR** agrees to provide to the **COMPOSTER** Source Separated Organic Wastes which the **GENERATOR** currently disposes of elsewhere.

2. Quantity

An amount of organic wastes not to exceed _____ tons per calendar month on average or an amount not to exceed the **COMPOSTERS** permitted tonnage as specified in **COMPOSTERS** approved registration application with the Massachusetts Department of Food and Agriculture (DFA).

3. Specifications

Organic wastes delivered to the **COMPOSTER** must be source separated. Non-organic waste contaminants must be consistently less than 5% by volume to avoid penalty charges. To ensure optimal compliance with separation specifications, the Center for Ecological Technology will provide information/education services for the **GENERATOR**. Agreement on the need for these services will be finalized before accepting deliveries of Organic Wastes.

4. Delivery

All deliveries to the **COMPOSTER'S** farm must be made between 8:00 a.m. and 4:00 p.m. on Tuesday and Thursday except the following holidays: Memorial Day, Fourth of July, Labor Day, Thanksgiving, Christmas, and New Year. Special arrangements for off-hour deliveries are possible, but discouraged. Trucks will not be allowed to sit outside the gate before 8:00 a.m. All deliveries will follow a mutually agreeable regular schedule, or with advance notice agreed upon between the **COMPOSTER** and the **GENERATOR** and/or their designated hauler. The **COMPOSTER** agrees to maintain his receiving area throughout the year to enable the smooth and efficient delivery of the **GENERATOR'S** Organic Waste.

5. Measurement

The **GENERATOR'S** hauler shall determine the net weight in pounds of each load of source separated organic waste by weighing the loaded vehicle and deducting the vehicle's tare weight. The net weight shall be divided by two thousand (2,000) and the quotient shall constitute the number of tons of Source Separated Organic Waste delivered to the **COMPOSTER'S** site. If the net weight cannot be consistently determined because of an unreasonable distance to the nearest truck scale, the **GENERATOR'S** hauler shall estimate the net weight of each load as an alternative measurement along with approval by the Composter. Weight slips must accompany each load of Organic Waste left at the Composter's sight. Failure to leave weight slips with each load can result in additional assessments for non-compliance or termination of future deliveries.

6. Price and Payment

a. The price to be paid for processing (tipping) the **GENERATOR'S** source separated organic waste at the **COMPOSTER'S** site shall be \$25.00 per ton for the first year of this agreement.

b. If upon inspection a load of Source Separated Organic Wastes contains excessive quantities of contaminants (up to 5% by volume) the **GENERATOR** will be assessed an additional \$50.00 per delivered ton to cover the cost of removing and disposing of such contaminants. If the volume of contaminants exceeds 5% of any

Appendix F. Contract between Farmer and Hauler, Continued

3

toxic or hazardous substances are found in a load, the entire load shall be rejected and hauled from the **COMPOSTER'S** site to an appropriate disposal facility at the **GENERATOR'S** EXPENSE. The cost to the **GENERATOR** for a rejected load includes the cost of reloading the contaminated materials at (\$100.00 per hr.) plus the hauling cost and disposal cost of a local disposal facility.

Toxic or hazardous substances are considered items; such as, car batteries, paints, automotive fluids - (oil, anti-freeze windshield washer fluid, etc.) and any other chemical or substance that is not suitable for organic composting.

During the start up of Source Separation at the **GENERATOR'S** facility, a grace period of one month will be allowed before penalty charges come into effect. However, if toxic or hazardous materials are detected in any load, during start up or otherwise, the full cost of removal and disposal of the contaminated load (as detailed above) will be assessed to the **GENERATOR**.

c. Invoices for loads of Source Separated Organic Wastes delivered to the **COMPOSTER'S** site shall be submitted/mailed to the **GENERATOR** within 14 days and payment shall be made in full within 30 days of the invoice date.

d. The **GENERATOR** acknowledges that the **COMPOSTER** does not extend credit and that all bills are due and payable as per the above; a late payment charge of one and a quarter (1.25%) per month shall be charged on all delinquent accounts unless a higher percentage is allowed by law, in which case the higher percentage shall prevail.

7. Duration of Agreement

This Agreement shall be and continue in full force and effect for a period of one (1) year starting May 1, 1998. Not less than 30 days prior to the end date of this Agreement, the **COMPOSTER** and the **GENERATOR** shall and if necessary modify the Agreement's terms to their mutual satisfaction for renewal for an additional One (1) year period.

8. Force Majeure

The **COMPOSTER** shall be excused for failure to accept and process Source Separated Organic Wastes from the **GENERATOR** and the **GENERATOR** shall be excused for failure to provide Source Separated Organic Wastes to the **COMPOSTER** in the event, to the extent, and during the times of such failures as caused by fire, explosion, flood, acts of God, breakdown of machinery, governmental acts, orders, or regulations, or by any cause whatever or not of a similar nature beyond the **COMPOSTER'S** or **GENERATOR'S** reasonable control.

9. **Non-Waiver**

Failure by either party at any time to require strict performance by the other of any provision hereof shall not constitute a waiver of any breach of the provisions hereof, or of any succeeding breach of this non-waiver clause.

10. **Notification**

Notice hereunder shall be personally delivered or sent by Mail to the address listed above.

11. **Breach**

Should either party commit any breach of this Agreement and fail to remedy same within thirty (30) days after written notice, the other party shall be entitled forthwith to terminate this Agreement by notice in writing without prejudice to any claim for damages or other relief arising out of such breach, and any waiver of any breach shall not be taken to be a waiver of any such subsequent breach.

The **COMPOSTER** retains the right to terminate this Agreement, or to refuse delivery of loads from the **GENERATOR** on the basis of repeated failure to comply with Source Separation requirements.

In the event that either party liquidates its business and/or discontinues its business for any reason, this Agreement at the option of the other party shall terminate immediately upon notice in writing of such termination.

13. **Successors and Assigns**

This Agreement shall insure to the benefit of and be binding upon the successors and permitted assigns of the parties hereto; it is assignable without the prior written consent to a successor; it shall not be assignable in whole or in part to another party otherwise without the prior written consent of the other party.

Approved By:

(Farm Representative/Title)

Date

(Generator Representative/Title)

Date

Appendix G. Letter to DEP regarding Compliance at Farm Site

DATE

MA DEP
436 Dwight Street
Springfield, MA 01103

Dear :

As we discussed, I am fully committed to operating my compost site in accordance with DEP standards. My next steps are outlined below:

- 1) The fields will be picked clean of plastic and other trash by October 15th. In the future, the compost will be picked clean as it is spread or will be screened prior to spreading.
- 2) I will use a minimum ratio of 3:1 manure and leaf and yard waste to waxed corrugated in my windrows. No more than 25% of the surface of the windrow will have exposed cardboard. A new visual barrier primarily consisting of leaves will be in place by December 15th. In the interim, I will either move incoming supermarket loads to a more hidden location, construct an adequate temporary visual barrier, or cover incoming loads to the extent where almost no cardboard is visible on the exterior of the windrows. Incoming loads will be mixed and covered on the same day they arrive.
- 3) I will remove trash from the back edge of the site and pick trash from the outside of the windrows by November 1st.
- 4) To address the plastic issue in the future, I will pick out plastic before mixing and windrow formation. I will also periodically pick the outside surface of the windrows and the compost site on a bi-weekly basis or after turning, whichever is sooner.
- 5) I will add bulking materials to the back windrow to improve the recipe to reach the 3:1 standard by November 15th.
- 6) No liquid manures will be stockpiled until NRCS or DFA can advise me on an adequate storage system. I will regularly scoop up any water ponding on the compost pad and mix it in the windrows.

I have also changed the lock on my gate and built a trench around the site to restrict access. Only approved vendors can deliver materials, and all have been given strict guidelines to adhere to regarding contamination. Over the longterm, I am working with the Center for Ecological Technology and DEP through the RIRC grant program to make additional upgrades to the operation including chipping accumulated source-separated brush.

I look forward to seeing you again soon and understand that CET will coordinate another site visit and meeting time for all of us around November 1st.

Sincerely,
FARMER

Appendix H. Equipment Survey Materials

Date

Get a free compost test and find the composting equipment you need at the best price!

Dear Composter:

The Center for Ecological Technology (CET), a non-profit organization, works with area composters to locate sources of feedstocks and upgrade the efficiency and profitability of compost operations. CET is currently seeking information about your equipment needs in order to improve equipment availability and costs for you and other area composters.

Working together with other composters can help you get access to equipment you need, when you need it and at the lowest cost. For example, CET helped three area composters work together to rent a trommel screen for a week last Fall. The composters were able to get a great deal, even though they each needed just two days of screening and the machine was not available locally.

Please take 5 minutes to fill out the enclosed two-page survey and return it to CET by December 15th, using the postage-paid envelope provided. If you respond by December 15th, CET will send you a free Compost Test from the UMass Testing Laboratory (\$20 value).

CET will use the information provided to facilitate equipment sharing, sequential rental, joint purchase and other ways to lower the cost to participating composters. CET will send responders a detailed list of vendors for the type of equipment specified and a list of other interested local composters.

CET is able to provide this service to you at no cost through funding from USDA SARE, MA DEP RIRC and EPA New England. Responders are under no obligation whatsoever. I urge you to take advantage of this opportunity as soon as possible. Please call me at (413) 586-7350 if you have any questions.

Sincerely,

Director of Special Projects

Return by December 15th to receive your FREE Compost Test (\$20 value).

Appendix H. Equipment Survey Materials, Continued

Name/Address Corrections

Phone: _____

1. Please describe the equipment that you currently use:

Bucket Loader

Make/Model/Year/Bucket Size: _____

How often used: weekly monthly quarterly yearly

Season used: spring summer fall winter year-round other _____

Rent/own: rent own

Operator: self-operated contractor-operated

Chipper/Grinder

Make/Model/Year: _____

How often used: weekly monthly quarterly yearly

Season used: spring summer fall winter year-round other _____

Rent/own: rent own

Operator: self-operated contractor-operated

Screener

Screen Size/Make/Model/Year: _____

How often used: weekly monthly quarterly yearly

Season used: spring summer fall winter year-round other _____

Rent/own: rent own

Operator: self-operated contractor-operated

Windrow Turner or other (please describe) _____

Make/Model/Year: _____

How often used: weekly monthly quarterly yearly

Season used: spring summer fall winter year-round other _____

Rent/own: rent own

Operator: self-operated contractor-operated

2. Please list any composting equipment you currently own that you would like to make available to other area composters and indicate the types of arrangement you seek:

Equipment Type Arrangement

_____ rent lease sell swap/barter other: _____

_____ rent lease sell swap/barter other: _____

3. Please describe any needed equipment you that you would like to start using now:

Bucket Loader

Make/Model/Year/Bucket Size: _____
How often used: weekly monthly quarterly yearly
Season used: spring summer fall winter year-round other _____
Rent/own options: joint rental joint on-going lease joint purchase swap/barter
individual rental individual purchase other: _____
Operator: self-operated contractor-operated

Chipper/Grinder

Make/Model/Year: _____
How often used: weekly monthly quarterly yearly
Season used: spring summer fall winter year-round other _____
Rent/own options: joint rental joint on-going lease joint purchase swap/barter
individual rental individual purchase other: _____
Operator: self-operated contractor-operated

Screener

Screen Size/Make/Model/Year: _____
How often used: weekly monthly quarterly yearly
Season used: spring summer fall winter year-round other _____
Rent/own options: joint rental joint on-going lease joint purchase swap/barter
individual rental individual purchase other: _____
Operator: self-operated contractor-operated

Windrow Turner or other (please describe) _____

Make/Model/Year: _____
How often used: weekly monthly quarterly yearly
Season used: spring summer fall winter year-round other _____
Rent/own options: joint rental joint on-going lease joint purchase swap/barter
individual rental individual purchase other: _____
Operator: self-operated contractor-operated

4. Would you like free technical assistance from qualified compost consultants to help improve your operation? yes no

If yes, please leave phone number and best time to call:

Phone _____ Time/Day _____

If you have any questions, please call John Majercak of CET at (413) 586-7350. Thank You!

Appendix H. Equipment Survey Materials, Continued

Date

Dear Composter:

Thank you for responding to the Center for Ecological Technology's (CET) survey regarding your composting equipment use and needs. We received many responses and are hopeful that some good opportunities for cooperative equipment rental have been created for you.

I have enclosed your free compost test kit along with the following:

- A list of composters interested in cooperative equipment use or purchase, sorted by equipment type.
- Contact information for these composters.
- A list of local equipment vendors.

CET will send this information to each equipment vendor and encourage them to contact you regarding your needs as soon as possible. We also encourage you to call other composters with similar needs as well as the equipment vendors.

If you requested technical assistance through the survey, CET's composting consultant Bruce Fulford will contact you in the next two weeks. Please call me at (413) 586-7350 if you have any questions. Thank you.

Sincerely,

Director of Special Projects

Composting Equipment Rental and Service Providers

Most vendors prefer to quote prices after a discussion and/or site visit with potential clients. Arrangements should be made months in advance to ensure that equipment is available and site conditions are suitable to effectively utilize the equipment when needed.

This listing does not imply endorsement by the Center for Ecological Technology (CET). Vendors can be added or removed from the list by contacting John Majercak at CET at (413) 586-7350.

Screeners

Following is a list of trommel screens. Deck screens may also be used for compost but generally do not perform as well as trommel screens. Deck screens can often be rented from local sand and gravel operations, soil dealers and contractors.

Boston Bark Corporation
Waltham, MA
(781) 894-4606
Contact: Vinnie Mula

McCloskey Bros. RE 621 trommel with 1/2" screen and remote stacker. Provided with CAT 950 loader and skilled operator.

Full Cycle
Westfield, MA
(413) 562-0193
Contact: Paul Liptak

McCloskey Bros. RE 621 trommel with 1/2" and 3/4" screens and remote stacker. Provided with loader and skilled operator.

Green Cycle
Hartford, CT
(860) 953-7799
Contact: Chris Field

McCloskey Bros. 621 trommel with 1/2" and 3/4" screens and remote stacker. Provided with loader and skilled operator. Also Wildcat 512 trommel screener.

Lion's Head Organics
Cohasset, MA
(781) 545-4645
(781) 765-6972 (pager)
Contact: Michael Bleakie

McCloskey Bros. RE 621 trommel with 3/4" screen and remote stacker - may have finer screen available. Available with or without loader and operator. Also provides site cleanups.

Shredding and grinding equipment

Flat bed feed grinders are generally considered more cost effective at processing large amounts of mixed woody materials and some are listed below. Tub grinders are commonly suited to producing smaller sized particles from cleaner materials. Local tub grinder owners include land clearers, sawmills, mulch manufacturers and construction and demolition firms.

Appendix H. Equipment Survey Materials, Continued

Cook Company
Mendon, MA
(508) 634-3300
Contact: Doug Cook

Two CBI high-capacity horizontal bed grinders and a tub grinder supplied with either a knuckle boom grapple or a loader and skilled operator. Loaders have either 4 or 8 cubic yard hi-lift buckets. Can process stumps, logs and brush and also shred mixed brush and bagged leaves.

Full Cycle
Westfield, MA
(413) 562-0193
Contact: Paul Liptak

Large capacity Peterson-Pacific 7400 flat bed feed grinder for tree parts including stumps, logs, brush, and leaves. Provided with CAT 928F loader and skilled operator. Also a CAT 229 track excavator and grapple for brush handling and CAT 225 with CBI shear for stumps.

GreenCycle
Hartford, CT
(860) 953-7799
Contact: Chris Field

Morbark 1200 tub grinder for logs, brush and leaves and will also accommodate some stumps. Provided with CAT 980 loader and skilled operator.

Hammond Lumber
Canaan, NH
Contact: Dennis Thompson
(413) 531-0976 or (603) 487-3476

Morbark tub grinder for all tree parts, including some stumps, logs, brush, and leaves. Provided with CAT 980 loader and skilled operator.

Compost turners

Mobile self-powered compost turners are available on a rental basis from two vendors on a daily or hourly basis, and costs include an hourly charge (usually with a minimum ½ day rental) plus transportation. Both of these firms have New Frontier turners which turn windrows that are about 7 feet high and 16 feet wide. Windrows must be laid out on reasonably graded working surfaces capable of supporting the equipment, with adequate drainage, traction and truck access.

Agresource, Inc.
Amesbury, MA
(978) 388-5110 Contact: Tim Gould

GreenCycle
Hartford, CT
(860) 953-7799 Contact: Chris Field

Date

Dear Composting Equipment Vendor:

The Center for Ecological Technology, a non-profit organization, has identified a number of composting operations in western Massachusetts that are interested in cooperatively renting grinding, screening and/or turning equipment or services (see enclosed list). We hope that arranging a group of nearby potential customers will provide an opportunity for your company to get equipment to these sites at a great price for them and a good profit for you. Please contact these operators at your earliest convenience. If you have any questions, please call me at (413) 586-7350. Thank you.

Sincerely,

Director of Special Projects

Appendix I. Waste Generator Cost Tracking Spreadsheets

Total: June 1998 - April 1999				11 Months			
Store	MSW Tons	# Hauls	Haul Fee	Tip Fee	MSW Cost	Cost/Ton	
Boston Road #2	221.59	28	\$90.00	\$57.50	\$15,261.43	\$68.87	
Greenfield #4	136.71	22	\$120.00	\$57.50	\$10,500.83	\$76.81	
Longmeadow #13	172.28	26	\$90.00	\$57.50	\$12,246.10	\$71.08	
St. James #1	129.62	15	\$90.00	\$57.50	\$8,803.15	\$67.92	
16 Acres #16	97.99	10	\$90.00	\$57.50	\$6,534.43	\$66.68	
Southampton #11	95.66	11	\$95.00	\$57.50	\$6,545.45	\$68.42	
Northampton #7	<u>232.81</u>	<u>38</u>	<u>\$95.00</u>	<u>\$57.50</u>	<u>\$16,996.58</u>	<u>\$73.01</u>	
Total	1086.66	150			\$76,887.95		
Avg/haul	7.24						\$70.76
Avg/ton							

Store	OM Tons	# Hauls	Haul Fee	Tip Fee	Flat Fee	OM Cost	Cost/Ton	Savings	% Savings	Diversion Rate
Boston Road #2	20.49	47	\$0.00	\$0.00	\$146.00	\$1,606.00	\$78.38	(\$173.30)	-1.0%	8.5%
Greenfield #4	50.64	92	\$0.00	\$0.00	\$250.00	\$2,750.00	\$54.30	\$1,000.63	7.0%	27.0%
Longmeadow #13	49.31	48	\$0.00	\$0.00	\$146.00	\$1,606.00	\$32.57	\$1,842.17	11.7%	22.3%
St. James #1	80.15	15	\$95.00	\$25.00	\$0.00	\$3,428.75	\$42.78	\$2,175.61	15.1%	38.2%
16 Acres #16	31.22	48	\$0.00	\$0.00	\$146.00	\$1,606.00	\$51.45	\$576.66	6.6%	24.2%
Southampton #11	70.44	9	\$95.00	\$25.00	\$0.00	\$2,616.00	\$37.14	\$2,358.02	20.5%	42.4%
Northampton #7	<u>91.95</u>	<u>14</u>	<u>\$95.00</u>	<u>\$25.00</u>	<u>\$0.00</u>	<u>\$3,628.75</u>	<u>\$39.46</u>	<u>\$2,864.17</u>	<u>12.2%</u>	<u>28.3%</u>
Total	394.20	273				\$17,241.50		\$10,643.95	10.2%	26.6%
Avg/ton							\$43.74			

MSW = Mixed Solid Waste (does not include construction & demolition waste)
OM = Organic Materials
Savings = (OM Tons x MSW Tip fee) + (OM tons / Avg MSW tons per haul x MSW Haul fee) - OM Cost
Estimate based on CD driver's report of proportion of load that each store contributed

Prepared by the Center for Ecological Technology

TRASH	3 months			Haul Fee	Tip Fee	Compactor Rental	MSW Cost	Cost/Ton			
	Month	MSW Tons	# Hauls								
March 1999		7.98	1	\$120.00	\$75.00	\$195.00	\$913.50	\$114.47			
April 1999		11.37	2	\$120.00	\$75.00	\$195.00	\$1,287.75	\$113.26			
May 1999		8.82	1	\$120.00	\$75.00	\$195.00	\$976.50	\$110.71			
Total		28.17	4				\$3,177.75				
Avg/haul		7.04		\$120.00				\$112.81			
Avg/ton											
COMPOST	Month	OM Tons	# Hauls	Haul Fee	Tip Fee	Compactor Rental	OM Cost	Cost/Ton	Savings	% Savings	Diversion Rate *
March 1999		23.42	4	\$120.00	\$30.00	\$195.00	\$1,377.60	\$58.82	\$777.96	25.3%	74.6%
April 1999		22.17	3	\$120.00	\$30.00	\$195.00	\$1,220.10	\$55.03	\$820.41	24.6%	66.1%
May 1999		14.49	2	\$120.00	\$30.00	\$195.00	\$869.70	\$60.02	\$463.95	20.1%	62.2%
Total		60.08	9				\$3,467.40		\$2,062.33	23.7%	68.1%
Avg/haul		6.68									
Avg/ton								\$57.71			

*Portion of trash being composted after recycling

MSW = Mixed Solid Waste (does not include construction & demolition waste)

OM = Organic Materials (includes food residuals and waxed OCC)

Savings = (OM Tons x MSW Tip fee) + (OM tons / Avg MSW tons per haul x MSW Haul fee) - OM Cost

Store Waste Stream Profile		Tons	Percent
Trash		9.39	23%
Compost		20.03	50%
OCC (cardboard)		10.05	25%
Containers		0.50	1%
Total		39.97	
Recycling and Composting Rate			77%

Prepared by the Center for Ecological Technology

Appendix J. In-store Separation Procedures and Signs

FOOD WASTE COMPOSTING PROGRAM

Your business is participating in a composting program for food wastes and other compostable materials. Below is a list of acceptable materials for this program:

COMPOSTABLE MATERIALS

1. Vegetable and fruit materials (unpackaged)
2. Waxed cardboard boxes (flatten to conserve space)
3. Non-recyclable (wet/soiled) cardboard
4. Unpackaged bakery, grocery, dairy, floral, and service deli products

DO NOT INCLUDE:

1. All plastic: -bags, liners, wrapping
 -trays
 -cups
2. Styrofoam trays, inserts and boxes
3. Metal bands
4. Meats, fish and oils
5. Other trash

Note: It is very important that no trash is put into the composting containers. All produce must be removed from plastic bags and wrapping. Rubber bands and twist-ties do not need to be removed from produce.

IN-STORE PROCEDURE

The compost dumpster is usually located off the produce loading dock. The Produce Manager and the Store Manager have keys to the compost dumpster, if the store elects to keep the compost dumpster locked.

Employees from each department are responsible for delivering compostable materials to the compost dumpster. Each department may wish to utilize designated barrels for collection of compostable materials. The produce department typically utilizes designated cart(s) and barrel(s) for transporting the compostables to the compost dumpster. Waxed cardboard boxes can also be used for collecting culled produce. The Department Manager should be alerted immediately if any department is not following correct procedures. If there is a problem that the Produce Manager cannot deal with directly, CET and/or the Store Manager will be contacted for assistance. For pick-up questions, contact [store's hauler] at (413) xxx-xxxx.

PURPOSE OF THIS PROGRAM

Composting can provide cost savings to businesses that participate in this program. Composting provides farmers with a supplementary income source and a product to sell or use on their own land. Diverting food wastes to composting also conserves landfill space and natural resources.

Trash Only

- ◆ **All plastic:**
 - ◆ **bags, liners, wrapping**
 - ◆ **trays**
 - ◆ **cups**
- ◆ **Styrofoam trays, inserts and boxes**
- ◆ **Metal bands**
- ◆ **Other trash**

Compostables Only

- ◆ **Vegetable and fruit materials (unpackaged)**
- ◆ **Waxed cardboard boxes**
- ◆ **Non-recyclable (wet/soiled) Cardboard**
- ◆ **Unpackaged bakery, grocery, dairy, floral, and service deli products**

Signs for supermarket composting program. Signs are bright colors and laminated. Dimensions are 8.5" x 11".

Compost Only

**Food waste and waxed cardboard only!
No plastic, styrofoam, metal, glass or trash.**

Sign for use on compost dumpsters and compactor chute doors.
Signs are printed on bright yellow card stock and laminated. Dimensions are 11"x17".

Appendix K. Close-out Letter - Waste Generators

Date

Dear Composting Project Participant:

The Center for Ecological Technology's (CET) grant-funded Composting Project, which provided free composting set-up and troubleshooting services to area businesses, will be coming to completion at the end of March. The composting program at your business will continue as usual through your current hauler and should continue to serve your needs for years to come.

The form on the reverse includes information on how to contact your hauler in the event of problems, a reminder of waste separation guidelines and the person in your company that you should address concerns to in the future. Please refer to the enclosed form if you have a question or problem about your composting program.

Until the end of March, CET can continue to provide free composting assistance to businesses that request our services. However, please don't hesitate to call after March if you have tried the contacts on the enclosed form and still need help. CET's two dozen employees will still be here, providing a variety of other programs including our Materials Exchange and Business Recycling Cooperatives, as well as a new project to grow composting activity in the greater Boston area.

Thank you for your efforts to divert organic wastes to farm composting operations. Over the last 4 years, CET's On-Farm Composting Project has worked with 42 waste generators at 62 locations, 7 farmers and 5 haulers to begin or enhance composting programs throughout the region. Over 20,000 tons of food waste, waxed corrugated cardboard, yard/leaf waste, manure/bedding, and clean wood waste have been diverted to composting operations since January 1997. Participating businesses have saved tens of thousands of dollars while supporting area farms and helping our environment.

Very few regions in the country can boast such numbers, and it is largely because of your interest and commitment that this has been possible. I am glad to announce to those who of you who don't know that the project has been awarded the MassRecycle Best Commercial Recycling Program Award for 1999.

Thank you again for your participation. If you have any questions about the enclosed information, please contact me at jimd@cetonline.org or (413) 586-7350.

Sincerely,

Waste Management Specialist

Appendix K. Close-out Letter - Waste Generators, Continued

Composting Program Information Sheet

The following should be contacted in order to address problems or make adjustments to your composting program:

Business: XXX Supermarkets
Contact: XXXXXX, XXX Waste Removal Coordinator
Phone: XXXXXXXXXX

Your compost hauler: XXXXXXXXXX
Who to call at your hauler: Dispatch (ask for XX) Phone: XXXXXXXXXX

Details of hauler service:

Your compost dumpster emptied on set schedule, twice weekly.

Your composting program

Currently, there are 11 XXX locations participating in the composting program.

Acceptable materials for composting in your program are:

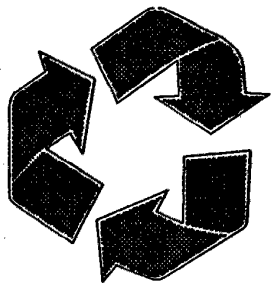
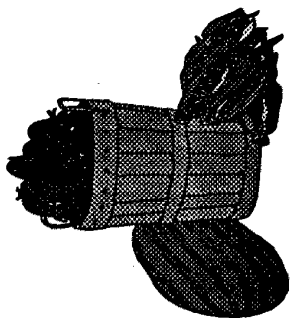
1. Vegetable and fruit materials (unpackaged)
2. Waxed cardboard boxes
3. Non-recyclable (wet/soiled) cardboard
4. Unpackaged bakery, grocery, dairy, floral, and service deli products

Unacceptable materials include:

1. Meats and fish
2. Any kind of plastic or styrofoam
3. Metal
4. Other trash

If you have any questions regarding this information, contact Jim Desmond at the Center for Ecological Technology (CET) at (413) 586-7350.

CERTIFICATE OF RECOGNITION



The Center for Ecological Technology (CET)
thanks you for your outstanding composting efforts.

Stop & Shop Supermarket

Collectively, program participants diverted 20,000 tons of
organic waste for composting through CET's award
winning and nationally recognized program.

Composting conserves natural resources and energy,
reduces pollution and helps local farms.

John Majercak
John Majercak, Director of Special Projects

Feb. 16, 2000

Date



112 Elm Street, Pittsfield MA 01201
Tel (413) 445-4556 Fax (413) 443-8123
E-mail: cet@cetonline.org

26 Market Street, Northampton, MA 01060
Tel (413) 586-7350 Fax (413) 443-8123
E-mail: cet@cetonline.org

Appendix K. Close-out Letter - Haulers

Date

Dear (Hauler):

The Center for Ecological Technology's (CET) grant-funded Composting Project, which provided free composting set-up and troubleshooting services to area businesses, will be coming to completion at the end of March. Your customers' composting programs will continue as usual, as will the composting facilities that you are currently using. The composting infrastructure that now exists in Western Massachusetts should continue to work for years to come.

CET has sent information to all the businesses that we have assisted, informing them that they should contact you, their hauler, in the event of problems or necessary adjustments to hauling services. The letter also included a reminder of waste separation guidelines. Enclosed is a certificate of appreciation that acknowledges your contribution to composting and waste reduction in Western Massachusetts.

Until the end of March, CET can continue to provide free composting assistance to businesses and waste haulers that request our services. However, please don't hesitate to call after March if you have tried to contact a composting customer or compost site without success. CET's two dozen employees will still be here, providing a variety of other programs including our Materials Exchange and Business Recycling Cooperatives, recycling and composting consulting for businesses and towns, and a new project to grow composting activity in the greater Boston area.

Thank you for your efforts to divert organic wastes to farm composting operations. Over the last 4 years, CET's On-Farm Composting Project has worked with 42 waste generators at 62 locations, 7 farmers and 5 haulers to begin or enhance composting programs throughout the region. Over 20,000 tons of food waste, waxed corrugated cardboard, yard/leaf waste, manure/bedding, and clean wood waste have been diverted to composting operations since January 1997. Participating businesses have saved tens of thousands of dollars while supporting area farms and helping our environment.

Very few regions in the country can boast such numbers, and it is largely because of your interest and commitment that this has been possible. I am glad to announce to those who of you who don't know that the project has been awarded the MassRecycle Best Commercial Recycling Program Award for 1999.

Thank you again for your participation. If you have any questions about the enclosed information, please contact me at johnm@cetonline.org or (413) 586-7350.

Sincerely,

Director of Special Projects

enclosure

Appendix L. MA DFA Exemption Language and Registration Form

MASSACHUSETTS DEPARTMENT OF FOOD AND AGRICULTURE (330 CMR 25.00)

AGRICULTURAL COMPOSTING REGISTRATION: APPLICATION FORM

I. Regulatory Requirement

Agricultural composting operations are conditionally exempt from site assignment as solid waste facilities pursuant to Department of Environmental Protection (DEP) regulations 310 CMR 16.05 (3) g, and h:

"(g) a composting operation for agricultural wastes, when located at an agricultural unit as defined in M.G.L. c. 128, s. 1A;

(h) a composting operation, when located at an agricultural unit as defined in M.G.L. c.128, s. 1A, which in addition to agricultural wastes, utilizes only the following compostable materials, provided the operation is registered with and complies with policies of the Department of Food and Agriculture:

1. leaf and yard waste;
2. wood wastes;
3. clean newspaper and cardboard;
4. clean shells and bones;
5. non-agricultural sources of manures and animal bedding materials.
6. not more than ten tons per day of compostable material composed of generator pre-sorted produce, and/or generator pre-sorted vegetative residues from food or beverage processing that consists solely of materials from plants, (e.g., husks, leaves, skins, sediments and roots) and other plant by-products from fruit or vegetable canning, freezing or preserving operations; and
7. not more than one ton per day of pre-sorted kitchen, restaurant and institutional food waste."

II. Registrant Information

Applicant/Owner _____

Address _____
P.O.Box or Street Address

Town Zip Code County

Telephone _____

Operator/Supervisor (if other than owner) _____

Appendix L. MA DFA Exemption Language and Registration, Continued

III. Compost Site Information

Name of Farm Unit _____

Location _____

Major Farming Activities _____

Start up date _____

Zoning Classification(s) _____

Chapter 61A? (y/n) _____

Surface waters located within 500 feet of site? (y/n) _____

Wetlands located within 500 feet of site? (y/n) _____

Public water supply located within 1/2 mile of site? (y/n) _____

Private water supply located within 250 feet of site? (y/n) _____

Please attach a map delineating the composting site, and a brief narrative which includes the following additional information:

- Acreage of parcel containing composting site
- Size of composting site and location of boundaries
- Locations of composting materials and storage areas
- Uses of land adjoining the site (e.g. residential, park, commercial)
- Identification of occupied buildings within 500 feet of site
- Any vegetative buffer between composting area and adjacent properties
- Access roads and drop-off areas for delivery of off-farm materials
- Slope and drainage characteristics
- Depth from surface to maximum high seasonal groundwater or bedrock
- Soil description and/or copy of Soil Conservation Service (SCS) map with site location marked

If additional space is needed for information in this or other sections of this application please attach pages as needed.

IV. Compost Input Materials

Please indicate if accumulated daily, weekly, monthly, etc.

<u>Material</u>	<u>Source (farm/off farm)</u>	<u>Quantity (tons/cubic yards)</u>
1.		
2.		
3.		
4.		
5.		

Total Quantity of Compost Inputs per year: _____

V. Composting Operations

Materials delivery and holding procedures:

Equipment and methods used for mixing, piling, and turning:

Monitoring for temperature, contaminants, odor, moisture:

Site security measures and procedures:

Contingency plans for materials in the event that operations cease:

VI. Compost End-use Information

Description of end-use on farm:

Compost users or markets other than farm:

End-product quality control or analysis:

Percentages of on-farm and off-farm uses of compost:

Appendix L. MA DFA Exemption Language and Registration, Continued

I certify that the information contained herein and attached hereto is true and accurate to the best of my knowledge and belief, and that I have read 330 CMR 25.00: Agricultural Composting Program.

Applicant's Signature

Date

Food Residuals/
Farm Connection

OUTREACH AND EDUCATION

EXPANDING ON-FARM COMPOSTING

A project in Massachusetts develops essential links between farmers, organics generators and haulers, creating an infrastructure for food residuals diversion and quality compost production.

*John Majercak,
Karen Bouquillon and
Sherill Baldwin*

DESIGNED to stimulate on-farm composting of commercial and agricultural organics in the four western counties of Massachusetts, the On-Farm Composting Project is finding ways to link farmers, haulers and commercial food residuals generators. Initial steps were taken between 1993 and 1995 when the Center for Ecological Technology (CET), a nonprofit organization located in Pittsfield and Northampton, received grants from the Massachusetts Department of Food and Agriculture (DFA) and USDA Rural Development. Composting workshops were given for farmers and demonstration projects were set up on farms, which increased interest and participation levels in farm composting. Perhaps more importantly, however, the projects helped CET identify barriers to the creation of a long-term, stable market for food and yard trimmings composting, and develop solutions to facilitate improved on-farm composting of commercial organics.

The lack of an established infrastructure was one of the first barriers encountered. Farm and commercial composters, haulers and waste generators are reluctant to invest time and money into setting up operations to serve a small, fledgling market with its associated risks. Those ready to begin operations needed information and technical assistance to succeed. It also was observed that the market needs a jump start to attract enough compost sites and waste generators and create a critical mass of participants, thus enabling cost-effective collection and hauling, with full trucks driving shorter distances.

Quality control was another issue. Loads

need to be free of contamination, composted properly and tested to ensure a quality end product. Many farmers will use the compost on their fields and some will sell to other markets, including nurseries and home gardeners. Compost produced for sale must meet market needs for quality, consistency and price.

SPREADING THE WORD

CET started the three-year On-Farm Composting Project in October, 1996 with \$217,000 in funding from the EPA's Climate Change Action Program, the U.S. Department of Agriculture's Sustainable Agriculture Research and Education Program (SARE), The Frank Stanley Beveridge Foundation, The Lawson Valentine Foundation and The Sudbury Foundation. Project participants receive CET's services at no cost.

Initial project outreach included a mailing to 375 farmers in Franklin, Hampshire and Hampden counties with the approved use of the Massachusetts Farm Bureau Federation mailing list. A brief note in the Farm Bureau newsletter encouraged members to read the letter and consider participating in the project. A more recent letter was sent to over 300 farmers from the Berkshire County Conservation District mailing list. To date, approximately 40 farmers have requested a CET site visit to evaluate their composting needs.

GETTING FARMERS STARTED

For farmers interested in accepting off-farm materials, the first step is registering

Photos courtesy of CET



Employees at C&S Wholesale Grocers (right) and other locations collect compostable food residuals.



with the DFA to be exempted from the Massachusetts Department of Environmental Protection (DEP) site assignment regulations. Registering allows farmers to accept leaf and yard trimmings; wood residuals; clean newspaper and cardboard; clean shells and bones; and nonagricultural sources of manures and animal bedding. Additionally, they can accept generator presorted produce and/or vegetative residues from food or beverage processing that consists of plants and other plant by-products from fruit or vegetable canning, freezing, or preserving operations (not more than 10 tons/day); and presorted kitchen, restaurant, and institutional food residuals (not more than one ton/day).

To successfully handle commercial materials, the farm needs to operate year round with road access throughout the seasons, and the farmer must promptly attend to the materials and be vigilant in reducing contamination. All of the farms have at least a packed earth pad, but not all have engineered pads. The largest farm operation is currently taking in 20 tons/week of commercial materials.

Participating farms are located predominantly near major roads within approximately 10 miles of the three major commerce centers in the Pioneer Valley area — Northampton, Springfield and Greenfield. Some farmers who already compost manure and bedding materials generated on-site or from nearby farms are interested in expanding operations to accept commercially generated food residuals and waxed corrugated cardboard. Others are completely new to composting and focus on handling agricultural residuals exclusively.

The farms use a bucket loader and/or manure spreader for composting. If they have both, the bucket loader fills the spreader, which in turn is used to create windrows. Windrows are turned every three to six weeks, often when the activity fits into the farmer's other duties. Waxed cardboard boxes are not shredded, but do break down quickly during the composting process.

CET's assistance program includes a number of services that vary depending on the farmer's needs. For example, since February, 1996 — with the assistance of Arnold

Voehringer, a technical consultant on re-tainer — CET has been helping Tim Smith, the new manager at Smith Vocational and Agricultural High School Farm in Northampton, learn how to run the composting operation. Smith Farm mixes the food residuals and waxed cardboard with manure, animal bedding and yard trimmings. CET staff met with generators to insure that materials were being properly separated, and made recommendations for tracking materials delivered to the farm by commercial haulers. "Composting is an integral part of our operations here," says Smith. "It provides valuable income to the farm while helping us manage our own waste in the most environmentally friendly manner."

CET also arranged for the Smith School Farm, the Four Rex Farm in Hadley and the University of Massachusetts at Amherst to sequentially use a rented screen. Approximately 1,000 cubic yards of high quality compost were produced, some of which is being sold in bulk for \$15 to \$25/cubic yard.

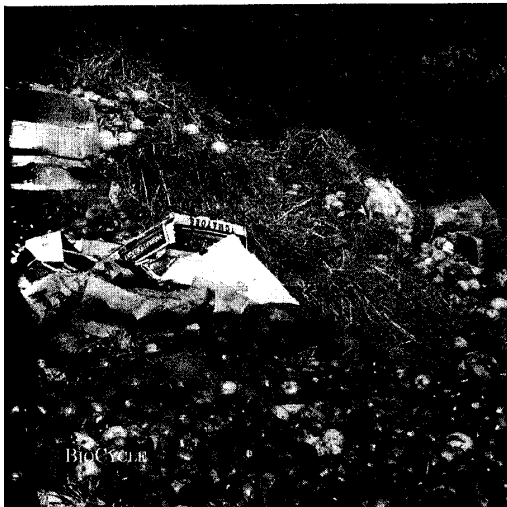
INVOLVING THE HAULERS

CET initially approached area haulers before contacting organics generators. During the first few months, their response ranged from "somewhat" to "not very" interested. Hauler interest and participation have significantly increased recently, however, due to a more effective approach. Instead of talking to them directly, CET now targets outreach to generators, who in turn request that their hauler provide organics collection services.

CET recommends that generators work with their current hauler first, in an attempt to build trust among all participants and to avoid contractual difficulties. Haulers have been responsive, due perhaps in part to limited options for conventional disposal in the region. The majority of small municipally-owned landfills in the state have closed in the last ten years. In most cases, haulers are not driving any further to bring their customers residuals to composting sites, and in some cases are driving shorter distances. With the majority of generators, haulers have provided top loading dumpsters. Restaurants in close proximity often share dumpsters for recyclables, compostables and trash due to space constraints.

The most important service to haulers is increasing the proximity and number of participating customers to augment the efficiency of their organics only routes. CET

To successfully handle commercial materials, the farm needs to operate year round with road access throughout the seasons.



Waxed cardboard and produce (middle) are mixed with manure, animal bedding and yard trimmings, and then composted in windrows at Smith Agricultural-Vocational School Farm (left).

Because the project is market-based, CET does not set any prices or contracts, and thus the economics must work for all parties involved.

also can facilitate subcontracting among haulers to provide service to isolated organics customers. For example, Bob Martin of Greenfield provides services for his own customers as well other haulers' customers on a subcontracted basis.

GENERATOR PARTICIPATION

The Stop and Shop Supermarket Company is participating at eight store locations. Sam Wolman, director of manufacturing, estimates that the company saved \$2,000 in waste disposal costs at the Northampton store during a five-month pilot program that CET initiated in the spring of 1997. CET helped to develop and document organics management procedures for the store and train employees. CET also provided troubleshooting and follow-up assistance, and has helped to promote the company's program to the public. Based on the success of the pilot program and subsequent expansions, Stop and Shop plans to add 12 of its western Massachusetts supermarkets over the next several months.

Much of the material coming from Stop and Shop is waxed corrugated cardboard as most of the stores divert produce residuals to pig farmers. Instead of placing the waxed corrugated in the trash compactor, staff now flatten the boxes and put them into an organics dumpster. The organics dumpster also provides a backup system when the farmer's collection containers are full. In addition, certain types of materials are sent to composting (e.g. residuals from juice making, pineapple cores, etc.) because they are not palatable to pigs. Most bakery and dry goods fit for human consumption are directed to local food banks. Several stores are experimenting with adding waste paper from supermarket offices where small quantities do not justify a separate recycling program.

"The program makes sense from both a business and an environmental perspective," reports David Grestini, Stop and Shop's Recycling/Waste Removal Coordinator. "Overall, the cost of composting organic materials is less than disposal."

More than 30 tons of fruit and vegetables are diverted each month from C&S Wholesale Grocers Inc.'s warehouse in North Hatfield to the Smith Vocational School Farm. C&S operates an area where produce is sorted and repackaged for shipping to supermarkets. Employees collect rejected produce in wheeled hoppers that are emptied into a customized 20-yard rolloff placed at one of the facility's loading docks. "Part of my job is to figure out ways to reduce our disposal costs, and we've done that very successfully," says Joe Covington, resource/waste coordinator at C&S. "We discard a very small percentage of our produce, but since we handle such a huge volume, that can still add up to many tons per week. The program fits well with our way of doing business. Composting is more economical than traditional disposal, helps our environment by replenishing soils and provides income to local farms."

KEY COMPONENTS

Twenty waste generators, six farmers and three haulers currently are taking part in the composting project, and CET is soliciting additional participants. Organics are being collected from 20 supermarket locations (Stop and Shop, Big Y and several independent markets), 10 restaurants, four institutions/schools and C&S. The haulers typically use reinforced eight-yard dumpsters and front-end loader trucks to handle the materials. An average of more than 60 tons/week of food residuals, waxed corrugated cardboard, yard/leaf trimmings, manure/bedding, and clean wood residuals pallets were diverted to new or expanded composting operations between January and October, 1997. Two CET waste management specialists manage the day-to-day operation of the program.

Results to date demonstrate that several unique aspects of the project are contributing to the initial success. First, the project is facilitating the creation of a marketplace for composting by providing technical assistance and education to a broad group of private sector participants. Because the project is market-based, CET does not set any prices or contracts, and thus the economics must work for all parties involved. Those interested are provided contacts to all other participants, but CET does not direct materials to specific locations. In addition, the project does not provide equipment or other subsidies and no public sector infrastructure (e.g. municipal hauling or composting) is involved.

Second, CET provides outreach and services that meet individual needs and motivations. Participants are provided with on-site, hands on assistance and significant follow-up services.

Finally, the positive regulatory and policy environment in Massachusetts is an important factor. An agreement between the DFA and the DEP provides a registration mechanism to allow small-scale, agriculturally based composting of commercial residuals. In addition, many small, unlined landfills have been closed under state order over the past five to 10 years, which has had the effect of limiting disposal capacity and increasing landfill tip fees.

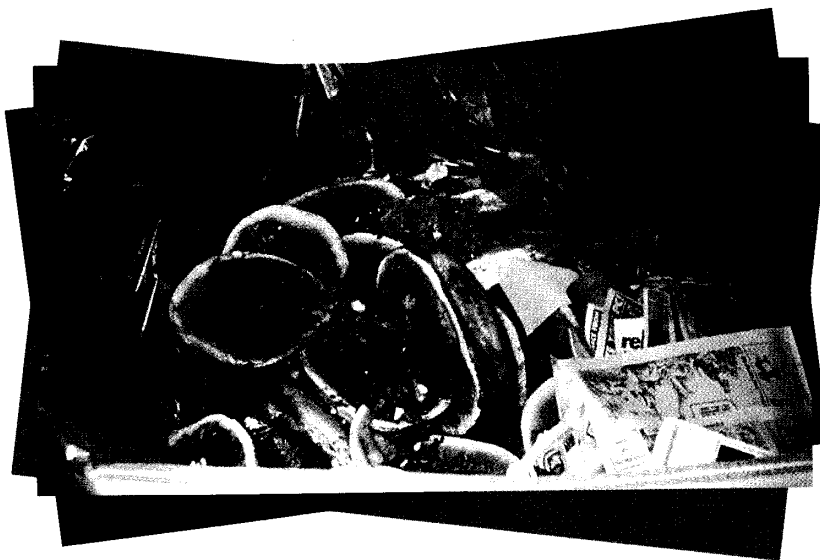
CET's goal is to divert an average of 170 tons/week of commercial organics to farms by mid-1999. A final program report will document lessons learned and steps to replicate the project. Outreach activities as well as expansion of the current project service area also are being considered. ■

John Majercak is Director of Solid Waste Programs for the Center for Ecological Technology in Northampton, Massachusetts. (cetnoho@aol.com). Karen Bouquillon and Sherill Baldwin are waste management specialists. Established in 1976, CET's mission is to demonstrate and promote practical applications of sustainable technologies, providing affordable solutions that serve the entire community.

Composting Supplement

Farming out food wastes

by John Majercak



Waste volumes and money are saved through a well-designed regional approach to commercial food waste composting.

A cooperative effort in New England is showing how food wastes can be composted successfully. The Center for Ecological Technology (Northampton, Massachusetts) is linking commercial food waste generators, haulers and farmers through its On-Farm Composting Project. The project is designed to stimulate on-farm composting of commercial and agricultural organics in the four western counties of Massachusetts.

A quick overview

CET started the three-year project in October 1996 with \$217,000 in funding from the regional U.S. Environmental Protection Agency (Boston), the U.S. Department of Agriculture (Burlington, Vermont) and three foundations. Initial work supported by federal and Massachusetts agricultural agencies laid the groundwork for this project.

Forty businesses at 70 locations, five commercial waste haulers and nine farmers currently are participating, and CET is soliciting additional participants. An average of more than 200 tons per week of food waste, waxed corrugated boxes, yard and leaf debris, manure and bedding, and clean wood and pallets is diverted to new or expanded composting operations.

A key participant: haulers

This innovative project entails an integrated set of critical elements.

CET targets outreach to waste generators, who in turn request that their current hauler provide organics collection service. CET recommends that generators work first with their current hauler, in an attempt to build trust among all participants and to avoid contractual difficulties. When customers request organics collection service, haulers have been responsive. In several cases, haulers now actively offer the service to their customers. Haulers may be responding, in part, to limited options for conventional disposal in the region and the availability of nearby composting operations.

Haulers typically use reinforced eight-cubic-yard dumpsters or 20- to 35-cubic-yard compactors to handle organics. To improve efficiencies of organics-only routes, CET works to increase the number and proximity of participating generators. In some cases, CET facilitates subcontracting among haulers to provide service to isolated organics generators.

A second key actor: farmers

CET also works closely with local farmers in using organics generated in the region.

Not just any farm can participate in the program. To successfully accept commercial organics, a participating farm must operate year-round and have road access throughout the seasons. It must also promptly attend to the materials and be vigilant in reducing contamination. All of the farms have at least a packed-earth pad, with some having engineered pads. The size of the participating farms varies, but the largest accepts about 20 to 30 tons weekly of commercial organics.

CET encourages farmers to use existing equipment to manage their relatively small composting operations in a low-technology method. Farmers use a bucket loader and/or manure spreader for composting (if using both, they use the loader to fill the spreader, which is employed to build windrows). Windrows are turned every three to six weeks, or when the activity fits into the farmer's other duties.

Compost is used on farms or is sold in bulk

John Majercak is Director of Waste Management Programs at the Center for Ecological Technology, a 22-year-old nonprofit organization working for changes in solid waste and energy practices. He can be reached at CET, 26 Market St., Northampton, MA 01060; (413) 586-7350, (413) 586-7351 (fax); cetnoho@aol.com (e-mail).

for \$15 to \$25 per cubic yard, depending on the volume and delivery requirements. Some farmers use all the compost they produce on their own farmland.

Technical assistance is critical

Determined by the farmer's needs, CET provides various forms of assistance. These include site assessment, state registration assistance, compost recipe development, quality control assistance, feedstock sourcing and assistance in public relations and marketing.

Technical assistance takes into account the differences among farming operations. Some local farms had composted manure and bedding materials for years and wanted to expand operations to accept commercially generated food wastes and waxed corrugated boxes. Others are completely new to composting and focus on handling agricultural residuals exclusively.

CET locates sources of bedded horse manure or other bulking materials for farmers who do not have access to it. For other farmers, CET helps source yard and leaf debris from municipal programs.

CET also is focusing on improving the composting of waxed boxes. Because the boxes are not shredded, they require a long period of time for decomposition to occur. CET currently is investigating options for economical

Supermarket chains love composting

The On-Farm Composting Project has helped several local supermarket chains launch or expand food waste composting systems.

The Stop and Shop Supermarket Co. is participating at eleven locations. CET provided several targeted forms of assistance, including aid in developing store and employee management procedures, troubleshooting actions and assistance in promoting the company's efforts to the public.

The Stop and Shop composting system was built on the company's existing waste management practices, where some stores provide prepared food to local food banks and give other food wastes to pig farmers. For those stores, the CET project provides a back-up organics alternative. Also, some organic materials — such as juice-production residuals and pineapple cores — are not palatable to pigs. Finally, it is getting increasingly difficult for area supermarket companies to develop reliable and lasting relationships with pig farmers.

The Stop and Shop effort entails more than food wastes. Waxed corrugated boxes are the primary component of the com-

postable materials. At several stores, mixed office papers are placed in the organics collection container, as the stores have too little paper volume for recycling collection.

David Grestini, the company's recycling and waste removal coordinator, reports that "the program makes sense from both a business and environmental perspective. By removing compostable material from our waste stream, we have lowered our disposal costs. Overall, the cost of composting organic materials is less."

Grestini's conclusion is shared by a competitor. Big Y Supermarkets began an organics management program several years ago, and recently revitalized the system with CET's assistance. Big Y has seven participating locations in the area and has increased organics diversion at these sites by approximately 75 percent.

"Big Y has realized significant savings through organics diversion," says Claire D'Amour, the firm's vice-president for corporate affairs. "We are pleased to be able to support local farms and the environment in these efforts."

Composting Supplement

arrangements to provide farmers with access to shredding, turning or other equipment. For example, CET arranged for three sites to share the rental of a mobile screen in order to lower processing costs.

Lessons have been learned

Results demonstrate that several unique aspects are contributing to the success of the project.

Marketplace created. By providing technical assistance and education to a broad group of private industry participants, the project is facilitating the creation of a marketplace for composting. Because CET's efforts are market-based, prices and contracts are set by participants. Thus, the economics must work for all parties involved. Interested parties are provided contacts to all other participants, but CET does not direct materials to specific locations. Also, the project doesn't provide equipment, collection service or operational subsidies, and no public-sector infrastructure is involved.

Assistance meets needs. CET provides, at no cost, outreach and services that meet the specific needs and motivations of each participant. This involves on-site, hands-on assistance and significant follow-up services. Current CET staffing for the project is 1.5 full-time employees.

Positive regulatory environment prevails. The policy and regulatory environment in Massachusetts is an important factor. Because many small, unlined landfills in the region have been closed by state order, landfill tipping fees have risen, thus making project economics favorable. Also, an agreement between the state environmental and agricultural agencies provides for a registration mechanism for small-scale, agriculturally based composting of commercial organics.

Cost savings bear out

CET has compiled cost savings data for participants including several supermarkets and a food wholesaler (see sidebar).

Supermarkets with pre-existing aggressive recycling programs and cost-control programs are experiencing waste management cost savings ranging from 8 to 15 percent. These benefits are sizable for an industry that traditionally operates with thin profit margins. A large food wholesaler achieved a 30 percent savings in waste management costs for the operations affected by the organics composting program.

Savings come from two places. First, because of waste reduction through composting, the number of times a hauler pulls a garbage compactor is reduced by approximately one-half. Second, because organics tipping fees are just \$25 per ton on average, generators save in comparison to the average fee of \$60 per ton at landfills. The additional costs of renting a container and having it hauled are more than offset by these savings.

In addition to these fiscal benefits, participants have received important public recognition for their efforts, including governmental awards.

Additional efforts planned

CET already has exceeded the original goal of diverting an average of 170 tons per week of organics waste, and now is focusing on increasing participation. The organization also will produce and distribute a final report that documents lessons learned and lists steps to replicate the project.

CET actively is investigating expansion of the project to include other geographic areas and commercial composting operations. For example, CET will be coordinating a similar, but smaller state-funded project in Brattleboro, Vermont and has begun discussions with officials in other New England states. **RR**

Appendix N. Project Budget and Staffing Information

Project Budget - 10/96 to 06/00

Personnel	
Director	\$4,250
Project Manager	\$54,546
Project Staff	\$79,655
Back-up Admin.	\$1,851
Total Personnel	\$140,302

Fringe	\$30,726
--------	----------

Personnel & Fringe	\$171,028
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Non-Personnel	
Travel	\$13,872
Supplies (Office)	\$1,741
Postage (Bulk & Daily)	\$2,151
Telephone	\$3,387
Copying (Materials/Office)	\$1,893
Equipment - scales	\$5,621
Contractual - UMASS	\$5,382
Contractual - Consultants	\$25,899
Farm Improvements	\$16,000
Total Non-personnel	\$75,946

Total Direct Expenses	\$246,974
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Total Indirect	\$22,960
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Total Project Cost	\$269,934
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Project Staffing Levels (FTEs)

<u>Period</u>	<u>Director</u>	<u>Manager</u>	<u>Staff 1</u>	<u>Staff 2</u>	<u>Total</u>
Year 1	0.025	0.4	0.8	0	1.225
Year 2	0.025	0.4	0.9	0.3	1.625
Year 3 (18 months)	0.025	0.4	0.3	0.3	1.025

In addition, technical consultants spent approximately 400 hours on project work, primarily in the last 18 months of the project (approximately .15 FTEs in Year 3).

Appendix O. Climate Change Impact Calculation Methodology

The total emission reductions value of the project to date was calculated at 5,711 MTCE for the cardboard, food, wood, and yard trimmings diverted to composting. CET also tracked the amount of manure/bedding brought in from off-site but did not include these materials in the emission reductions calculation since there is not an emission factor for them.

The emission factors used are based on the baseline disposal method specified and the recovery practice used. For this project the baseline method is a landfill with no methane recovery and the alternative method is composting. To determine the actual factor to multiply the waste tonnage by, subtract the baseline emission factor from the alternate method emission factor. See the table below for the actual values used for this project.

			Factor	
			Landfill	
Material Type	Composting		No Recovery	Final Emissions
Corrugated Cardboard	-0.7016		0.2698	-0.9714
Food Discards	0.01		0.2905	-0.2805
Wood	-0.6685		-0.0433	-0.6252
Yard Trimmings	-0.09		-0.0251	-0.0649
	Tons		Factor	MTCE reduction
Corrugated Cardboard	3310		-0.9714	-3215.334
Food Discards	5816		-0.2805	-1631.388
Wood	508		-0.6252	-317.6016
Yard Trimmings	8420		-0.0649	-546.458
Manure/bedding	3702		none	none
Total	21756			-5710.782

Note that the emission factors used for food waste and yard waste are under revision and will be changing in the future. Therefore future reports of project results may report a slightly different number.

These emission factors are based on a toolkit developed by the Office of Solid Waste of the US EPA. You can view and download this toolkit at <http://www.epa.gov/globalwarming/actions/waste/software.html>. Composting emission factors for corrugated cardboard and wood were developed using recycling proxies not found in the version of WARM available on the Internet.

Appendix P. Other Materials Available

The following project documents are also available:

Guidelines for using compost in the green industries

Published UMass Extension and CET (24 pages)

Available by mail only (\$8 S&H) (see below)

Composting commercial food waste and waxed corrugated cardboard on farms - operational checklist

Published by CET for MA DEP (4 pages)

Available by web or mail (\$3 S&H) (see below)

Composting commercial food waste and waxed corrugated cardboard on farms - general guidelines and case studies

Published by CET for MA DEP (approximately 25 pages)

Available by web or mail (\$8 S&H) (see below)

Download documents as .pdf files for free from CET's website at www.cetonline.org.

To receive a mailed hard copy, send your mailing address and a check made out to CET for the appropriate shipping and handling fees to CET, 26 Market Street, Northampton, MA 01060.

Appendix Q. Other Helpful Resources

Appropriate Technology Transfer for Rural Areas (ATTRA)

P.O. Box 3657

Fayetteville, AR 72702

Phone: 1-800-346-9140 — FAX: (501) 442-9842

Farm-Scale Composting Resource List - an excellent, extensive list (from which most of the information below is derived).

<http://www.attra.org/attra-pub/farmcompost.html>

The US Composting Council Home Page

<http://CompostingCouncil.org/>

Cornell University Composting Home Page

<http://www.cals.cornell.edu/dept/compost/>

EPA Solid Waste Management: Composting Resources

<http://www.epa.gov/epaoswer/non-hw/compost/>

California Integrated Waste Management Board Publications on Compost & Yard Waste

<http://www.ciwmb.ca.gov/publications/default.asp?cat=2>

BioCycle Magazine

419 State Ave.

Emmaus, PA 18049

610-967-4135

610-967-1345

biocycle@jgpress.com

<http://www.jgpress.com/>

\$69/12 issues a year

BioCycle is the leading trade magazine — published since 1960 — on farm, municipal, and industrial composting. Some of the nice features to BioCycle include: profiles and articles on compost operations and businesses, compost methods, compost uses, literature reviews, research reports, industry trends, economics and marketing, and equipment and supplies. BioCycle covers all aspects of the compost industry whether MSW, livestock manures, yard trimmings, woody materials, food residuals or biosolids.

Massachusetts Department of Environmental Protection

Web resources - Municipal composting guidance documents, and Composting Technical Assistance- A list of publications and visual aids for composting

<http://www.magnet.state.ma.us/dep/recycle/recycle.htm>

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